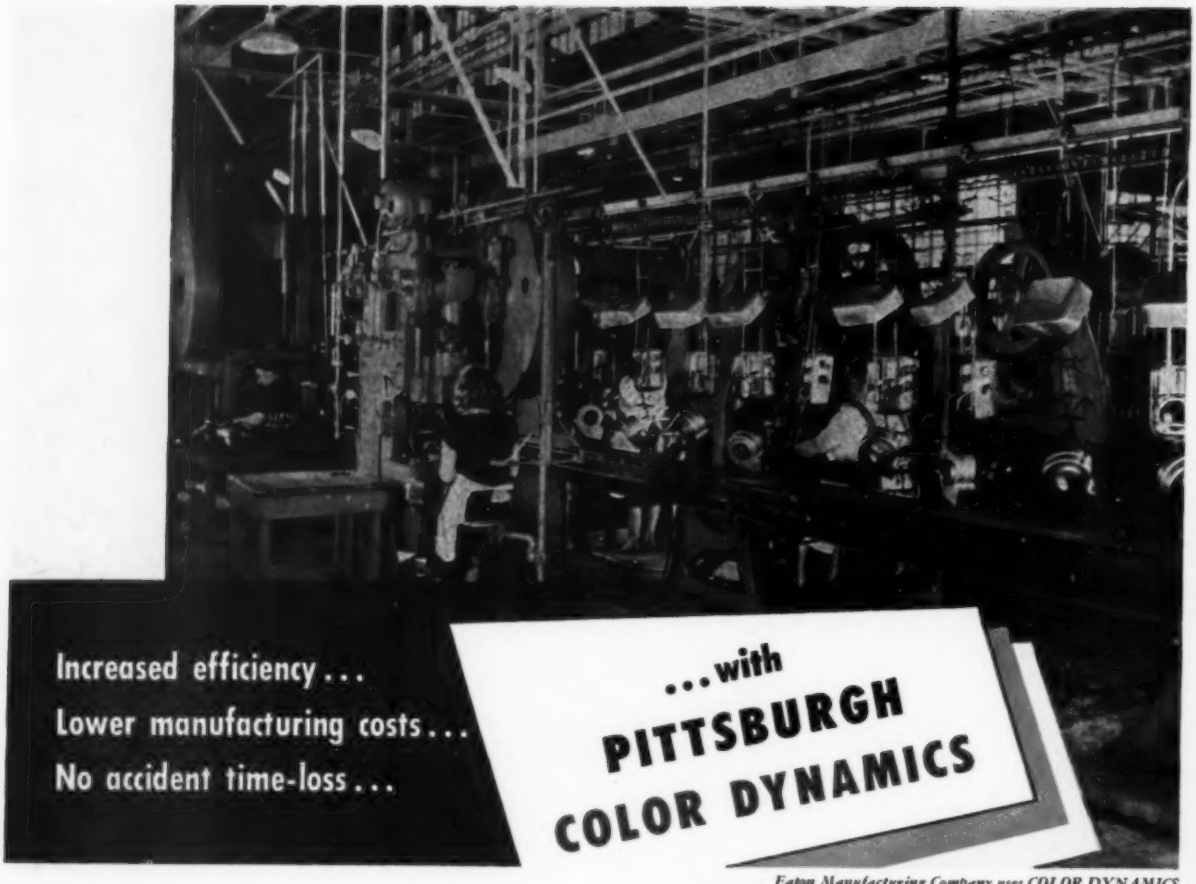
Vol. 39, No. 8

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

STUDENT PROJECTS NUMBER



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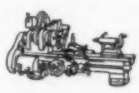
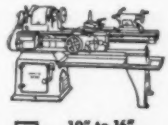
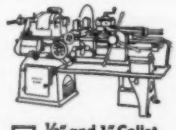


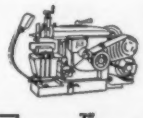
☐ 9" and 10" BENCH LATHES



☐ 10" to 16" FLOOR LATHES



☐ ½" and 1" Collet TURRET LATHES



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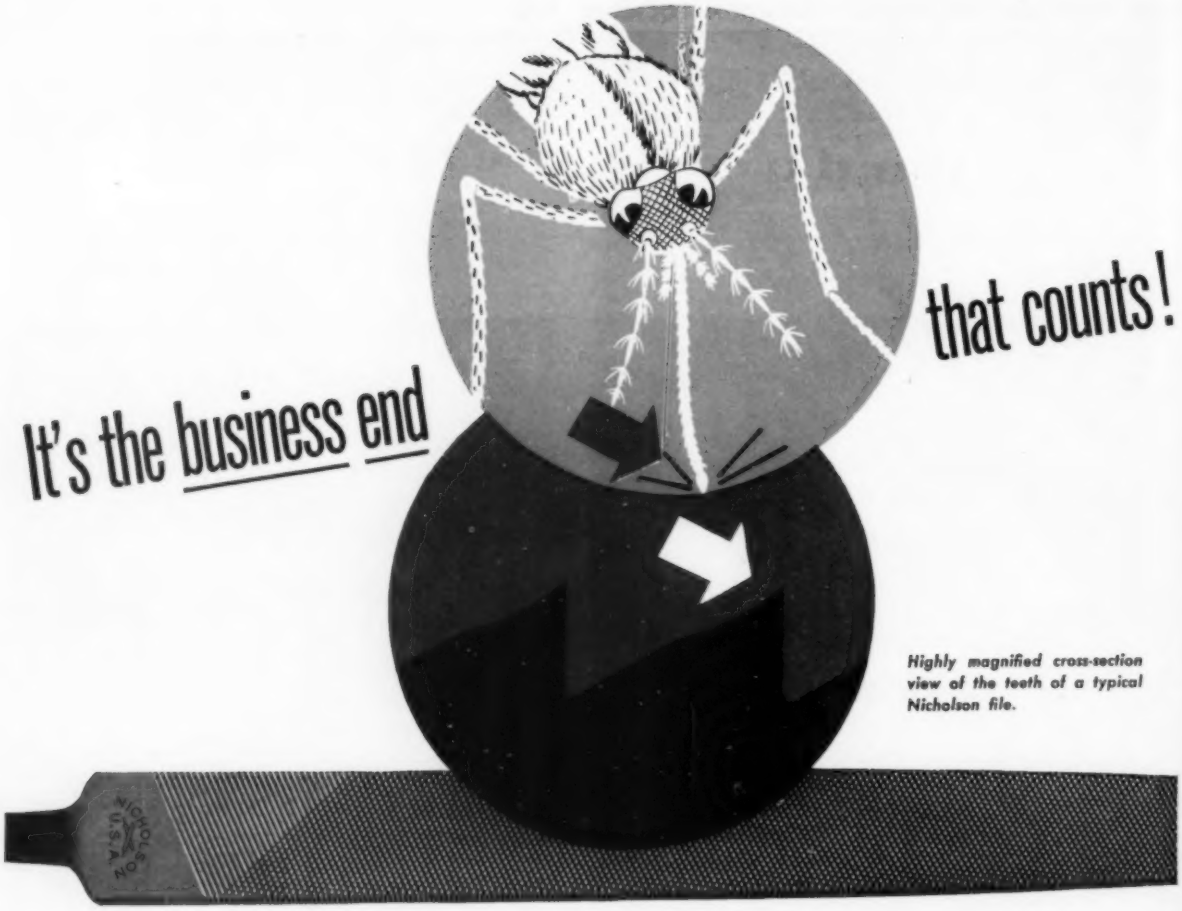

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OCTOBER, 1950

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THE SHOP TEACHERS' PROFESSIONAL MAGAZINE

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Please Note

Send in your association news, personal news, and general news. We will gladly publish it. But please remember that this material must be in our hands at least twenty days before the publication date.

This Month's Cover

The photograph for the October cover of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION was submitted by Benjamin J. Novak.

It pictures students of the industrial bakery course at the Murrell Dobbins Vocational-Technical School, Philadelphia, Pa.

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Articles Indexed. — The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

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ASSOCIATION NEWS

COMING CONVENTIONS

Sept. 21–23. **National Graphic Arts Education Association,** at Chicago, Ill. Headquarters, Sherman Hotel. Secretary, Fred J. Hartman, Washington, D. C.

Sept. 29–30. **Ohio Vocational Association,** at Columbus, Ohio. Headquarters, Hotels Chittenden and Fort Hayes. Secretary, George L. Brandon, 102 Annex D, 12th Ave., Ohio State University, Columbus 10, Ohio.

Oct. 2–6. **National Recreation Congress,** at Cleveland, Ohio. Headquarters, Hotel Statler. Secretary, T. E. Rivers, 315 Fourth Ave., New York 10, N. Y.

Oct. 6–7. **Four-State Regional Conference,** at Pittsburg, Kans. Headquarters, Kansas State Teachers College. Chairman, Dr. V. J. Melton, Pittsburg, Kans.

Oct. 9–12. **Future Farmers of America,** at Kansas City, Mo. Headquarters, Municipal Auditorium. Executive secretary, A. W. Tenney, Office of Education, Washington, D. C.

Oct. 18–20. **N.E.A. Department of Adult Education,** at Chicago, Ill. Headquarters, Sheraton Hotel. Secretary, Leland P. Bradford, N.E.A., 1201 — 16th St. N.W., Washington, D. C.

Oct. 24–28. **National Society for Crippled Children and Adults,** at Chicago, Ill. Headquarters, Stevens Hotel. Secretary, Lawrence J. Linck, 11 S. La Salle St., Chicago, Ill.

Oct. 26. **Indiana Vocational Association,** at Indianapolis, Ind. Headquarters, Stuart Hall, Arsenal Technical School. Secretary, Glenn Barkes, 802 E. Market, New Albany, Ind.

SPRING INDUSTRIAL EDUCATION CONFERENCE

The University of Missouri College of Education and the State Department of Education jointly sponsored the annual Industrial Education Spring Conference in Columbia on April 21–22. Three general sessions, numerous sectional meetings, an M.I.E.A. business meeting and luncheon comprised the conference.

Dr. G. Harold Silvius, chairman of the Department of Industrial Education, Wayne University, was the speaker at the general session and the industrial-arts section.

Other speakers included: Tracy E. Dale, assistant commissioner for vocational education, State Department of Education; M. Reed Bass, director of David Ranken Jr., School of Mechanical Trades; Frank Heagerty, superintendent of schools, Lebanon; Marion E. Gibbons, principal, Central High School, St. Joseph; Dr. Edward C. Roeber, counselor-trainer, University of Missouri; and Gordon Renfrow, director of field service, Missouri State Teachers Association.

Presiding at the general sessions and the luncheon meeting were: George E. Kohrman, director of industrial education, State Department of Education; Hollis W. Dahlor, director of vocational education, Kansas City Public Schools.

Officers of the Missouri Industrial Education Association, elected for the coming year, are: president, Glen Whitney, Lexington; and vice-president, Otho L. Barnett, Kirksville, Mo.

ANNUAL INDIANA INDUSTRIAL EDUCATION ASSOCIATION CONVENTION

The eighteenth annual convention of the Indiana Industrial Education Association was held at Turkey Run State Park on April 27–28 and 29.

Officers for this year were Gordon O. Johnson, Indianapolis, president; Oliver C. Bumb, Muncie, vice-president; H. G. McComb, secretary-treasurer.

An excellent program, including speakers from nine different states, was presented.

Programs for vocational directors and administrators were scheduled on Thursday. Carl J. Gray of Plainville, Conn., and Richard Hodgson of Wahpeton, N. Dak., were "headline" speakers. Clarence L. Greiber, director of Vocational and Adult Education for Wisconsin, was the first speaker on the Friday morning session.

Those engaged in Distributive Education held sessions on both Friday and Saturday.

Industrial-arts sessions were held Friday afternoon and Saturday morning.

Frank C. Moore, of Cleveland, president of the A.V.A., opened the Friday afternoon general sessions with a splendid address on the subject: "Today and Tomorrow."

Glade Wilcox of Texas A. and M. College discussed "Organizing Industrial Arts Electrically."

Tom Collins, humorist and philosopher of Kansas City, Mo., gave the principal address Friday evening to a very large audience. His unique address on the subject "This Promising World" was challenging as well as entertaining and inspirational.

Other headline speakers from industry and educational institutions included Dr. James L. Kraft, founder of Kraft Foods Company; Ed. Darnell, assistant Chief of Standards, Allison Division of General Motors; Duke Golden of the Perfect Circle Corporation; Dr. H. R. Kinker of Indiana University; G. P. Salen, Purdue University; and Robert Wyatt, executive secretary, Indiana State Teachers Association.

One of the "high lights" of the three-day session was the address given by Professor Arthur B. Mays of Illinois University, who spoke at a meeting early Saturday morning sponsored by the honorary fraternities at Purdue, Ball State, and Indiana State. Prof. Mays spoke on the subject "The Role of Industrial Education in this Era." This session was in charge of Mu Chapter, Iota Lambda Sigma.

About 650 registered during the three-day session. Many students from Indiana State, Purdue, and Ball State were in attendance.

Many teachers in the state participated in various program sessions. Mu Chapter of Iota Lambda Sigma, honorary fraternity in industrial education, held an initiation for new members Thursday evening.

The splendid school exhibits included scores of interesting projects from many sections of the state. Albert Longbrake was chairman of the school exhibits.

Thirty-seven commercial exhibitors had on display an excellent collection of new books, equipment, tools and supplies of interest to teachers of industrial education.

The following officers were elected for next year: president, Oliver C. Bumb, Ball State Teachers College; vice-president, Aaran Adams, Marian; secretary-treasurer, H. G. McComb, State Director of Industrial Education, Indianapolis.—*Sylvan A. Yager*

EPSILON PI TAU INITIATION

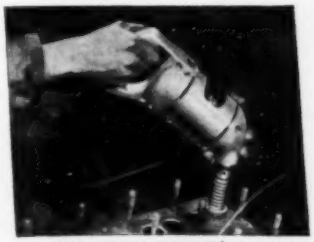
Psi Chapter of the Epsilon Pi Tau Fraternity, State Teachers College, California, Pa., held its spring initiation on April 29, 1950. The initiating team of Kent State University, Kent, Ohio, was in charge of the ceremony.

(Continued on page 6A)

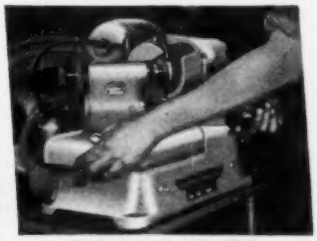
OVER 100 WAYS TO TRAIN STUDENTS

4 ***B&D SANDERS*** *each give you four uses—sanding, grinding, rubbing and wire brushing. New 7" Junior model (shown) is ideal for small shops!*

3 ***B&D POLISHERS*** *remove dirt and grime, polish and seal car surface in one operation. New Junior Polisher ideal for small shops. Team up with* ***B&D VACKAR**** *Vacuum Cleaners.*



3 ***B&D VIBRO-CENTRIC**** *Valve Seat Grinders quickly put a mirror finish on valve seats to match refaced valves for tight-fitting assemblies.*



4 ***B&D VALVE REFACERS*** *quickly and accurately grind valve faces, stems and tappets in all cars, trucks, tractors.*

25 ***B&D SCREW DRIVERS*** *handle a wide range of screw driving and nut running, including motor tear-down and assembly.*

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ASSOCIATION NEWS

(Continued from page 4A)

Members of this team were: Robert D. Watt, Harold Rizor, Dante Sasali, Donald Coe, and Donald Srail.

The following apprentices were initiated: Bruce Bartee, Richard Cadwallader, James Caulkett, Robert Colteryahn, Jr., John Kanuk, Alex Kovacs, Charles Laughlin, John Maley, Clyde Ober, Julius Palmisano, Thaddeus Piotrowski, Dominick Retella, Thomas Schneck, Frank Selden, Heiny Shippling, and Benjamin Stasko.

Following the initiation, a banquet was held for the members and their guests.

Dr. Shriver L. Coover, head of industrial arts at California, was the toastmaster, and Dr. Robert M. Steele, president of the college, introduced Judge Blair F. Gunther of the State Superior Court of Pennsylvania, who gave a very interesting talk on Communism and how to recognize it.

Following this, Anthony T. Stavaski, faculty trustee, presented the members with their keys and introduced the guests for the evening.—*Sterling D. Huggens, Secretary.*

THE SPRING CONFERENCE AT OSWEGO

The twelfth annual spring industrial arts conference was held at State Teachers College, Oswego, N. Y., on May 4 and 5, 1950.

At the general meeting on Thursday morning, at which Dr. Harvey M. Rice presided, Dr. Gordon O. Wilber gave an over-all account of his ten thousand mile trip studying the industrial-arts situation of our country.

The afternoon was given over to visiting shops, laboratories, and the commercial exhibits in the gymnasium.

The main address at the annual banquet was given by Dr. G. Harold Silvius, Wayne University, Detroit, Mich. His subject was "The Industrial Education Teacher and His Profession."

The Friday program started with an 8 o'clock Epsilon Pi Tau breakfast at which James Hastings was chairman.

Dr. C. R. Hutchcroft was chairman at the morning meeting, at which Dr. Silvius spoke on "The Status and Trends of the 1950 Industrial Arts."

There was an informal luncheon at 12 o'clock, after which The Ship's distribution of prizes took place.

In the evening, open house was held at the industrial-arts building.

NEW ENGLAND INDUSTRIAL-ARTS TEACHERS CONVENTION

The New England Industrial Arts Teachers Association will hold its annual convention on November 3 and 4 in Springfield, Mass. The convention headquarters will be at the Sheraton Hotel.

Dr. Kenneth Brown, assistant director of fine and industrial arts at Philadelphia, will be the main speaker and will speak on the convention theme, "Industrial Arts in the New Building Program."

Commercial and school exhibits, round tables, and business meetings will be held at the Springfield Trade High school. A feature of the convention will be a tour of the Springfield Armory.

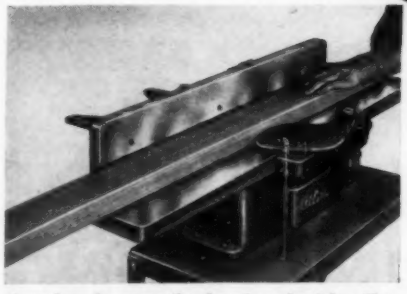
FOUR-STATE INDUSTRIAL ARTS AND VOCATIONAL EDUCATION CONFERENCE

The 1950 Four-State Industrial Arts and Vocational Education Conference will be held Friday and Saturday, October 6 and 7, at the Kansas State Teachers College, Pittsburg, Kans.

Principal speakers will be Frank Moore, president of the A.V.A., Dr. H. H. London of the University of Missouri, Dr. DeWitt Hunt, president of the American Industrial Arts Association, and R. W. Anderson, superintendent of the Neosho, Mo., public schools.

This annual conference is held jointly by the states of Arkansas, Kansas, Missouri, and Oklahoma.—*J. V. Melton.*

Bigger and Better in Every Way



Long boards are easily planed on the Atlas. The 42" long table provides ample, safe support.

Cutter head easily removed for resharpening blades. Ends the need for individual blade adjustment.

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Those are but a few of the outstanding features of this new Atlas 6" jointer that mean better workmanship for your students, easier teaching for you, and a sound tool investment for your school. Ask your Atlas dealer for complete details.

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Give him Snap-on tools, the choice of better mechanics, and he's ready with the right tool, the right size, strength, balance, feel, and fit to turn out a job that will be a credit to your teaching ability.

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All popular sizes

Quick Clamps
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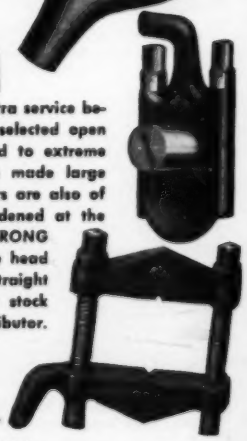
• Hargrave Clamps have been constantly improved with the aid of skilled mechanics to offer greater operating advantages and increased durability. Individually tested, they must be stronger, tougher and flaw-free. Made in openings from ¾ in. to 12 ft., from ½ in. to 16 in. deep.

WRITE FOR CATALOG showing the complete line of Hargrave Individually Tested Clamps, Chisels, Punches, Brace Wrenches, Star Drills, Washer Cutters, File Cleaners, etc.

Waverly & Main Aves.
Cincinnati 12, Ohio

HARGRAVE Tested Tools
THE CINCINNATI TOOL COMPANY

ARMSTRONG
Drop Forged
LATHE DOGS



ARMSTRONG Lathe Dogs give extra service because they are drop forged from selected open hearth steel, and, are heat treated to extreme toughness and stiffness. Hubs are made large enough to permit re-tapping, screws are also of special analysis steel and are hardened at the point to prevent upsetting. ARMSTRONG Dogs come in 10 types with square head or safety headless screws, with straight or bent tails. They are carried in stock by your local ARMSTRONG Distributor.

Write for Catalog.

ARMSTRONG BROS. TOOL CO.
5222 West Armstrong Ave., Chicago 30, U.S.A.

We're mighty proud of the big job Marquette equipment performed at the Indianapolis Speedway again this year. Our boys were kept plenty busy right up to the start of the race . . . helping to make sure that every car was in tip-top condition, rarin' to go.

The speedboys had a lot of nice things to say about our service. One mechanic, Bill DeMote, said, "Without Marquette welding we would have been lost." Here's what Wilbur Shaw, three time winner of the "500" and now president of the Indianapolis Motor Speedway Corp., told us:

"I think your welding engineers did a grand job and the quality of your welding equipment and supplies, and battery chargers, has certainly won the unqualified acceptance and enthusiasm of the entire racing fraternity."

Welding race cars is kinda glamorous compared to most jobs. But when you stop to think of all the kinds of work Marquette welders do, you realize again how doggone important good welding really is.

If you've got welding problems on your mind, or questions about any angle of welding, why not get in touch with the folks at Marquette? They're specially glad to co-operate with schools and training shops . . . and of course there are school discounts on all Marquette equipment.

That reminds me . . . if you don't have copies of the handy Marquette GUIDE TO BETTER WELDING, write for some today. This 34-page booklet is packed with information that is valuable for training and instruction.

Be seeing you around.

Official and Unanimous!

AT INDIANAPOLIS SPEEDWAY

MARQUETTE CHALKS UP A PERFECT SCORE IN MAKING 625 WELDS

Marquette welding equipment came through with another spectacular record of performance behind the scenes at the 34th Annual 500-mile auto race at Indianapolis. During the month of hectic preparation for the big race, Marquette welding engineers did vital jobs on every one of the 66 cars entered. In all, they made 625 welds at Marquette's official race-track welding station—including every kind of job from steering arms to rear axles.

Model 72

Yes, once again Marquette welding equipment has demonstrated its versatility. And the efficiency and effectiveness of Marquette welding has been proved by the way in which every weld held up.

Proved at the Speedway, Marquette welding equipment can prove itself in *your* shop. You'll find that it pays to invest in the *best*.

GET IT FROM YOUR JOBBER

MARQUETTE
REGISTERED U.S. PAT. OFFICE
INSTANT ARC
A·C WELDER

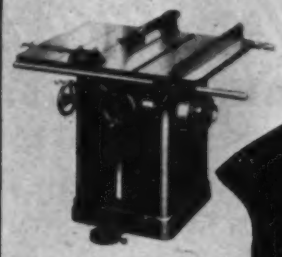
Fully Tested—Fully Guaranteed

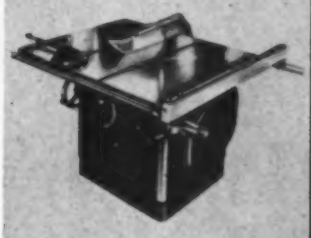
Marquette Instant-Arc Welders are fully tested and listed by Underwriters' Laboratories, Inc. . . . and are fully guaranteed against defective material and workmanship for one year.

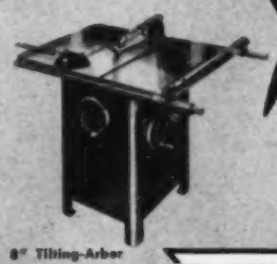
MARQUETTE MANUFACTURING CO., INC.
307 E. Hennepin Ave. • Minneapolis 14, Minn.

DELTA's complete quality line has

Saw Jointer Combination
2 models


10" Tilting-Arbor Saw
2 varieties


12" Tilting-Arbor Saw
6 varieties


8" Tilting-Arbor Saw
2 varieties

Delta Multiplex
40A

Tool Grinder
with Twin-Lite® Safety Shields
16 varieties

DELTA
MILWAUKEE
®

Belt Sander
2 varieties

Disk Sander
3 models
4 varieties

Mortiser

Wood Lathe
2 varieties

6" Jointer
2 varieties

8"-12" Jointer

24" Scroll Saw
2 varieties

Combination Spot
and Arc Welder
2 varieties

Toolmaker®
Surface Grinder

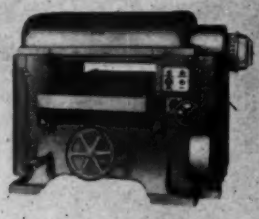
20" Band Saw
3 varieties

36" Band Saw
3 varieties

14" Band Saw
4 varieties

- Delta-Milwaukee® Machine Tools
- Delta® Multiplex Radial Arm Saws
- Crescent Woodworking Machines

the right machines for your program and budget



P-24 Planer

14" Drill Press
2 models — 20 varieties

17" Drill Press
2 models — 16 varieties

Cabinet Shaper

53 machines!...246 varieties!

The Delta line has the machines you need. It's the most complete line available — the only line with complete accessories to make every machine more useful.

What's more, Delta machines are ideal for the school shop, too: They are safe and easy to operate. They are economical to buy and operate. They are compact, occupy little floor space. Their height is convenient for students.

Industry wants people trained on Delta machines. For they are machines that are used by practically every branch of American industry.

Investigate further the advantages of the metalworking and woodworking machines in the broad Delta line. See them now at your nearby Delta distributor.

Send coupon below for facts on every machine in the entire Delta line — and for a free copy of "How to Plan a School Workshop."

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Available on deferred payments to fit your budget.

These typical quality features insure long life, continued accuracy, and low maintenance costs!

Lubricated-for-life Ball Bearings. Never need oiling—they're lubricated for life before they leave the factory. Double-sealing keeps dirt out, lubricant in.

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Pre-loaded Bearings. An extra manufacturing operation removes "end play." This provides maximum rigidity and accuracy under load and increases bearing life.

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Dynamically-balanced Pulleys. All pulleys which rotate at high speed are dynamically balanced to help eliminate damaging vibration.

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Send me free catalogs and bulletins on the complete Delta quality line—also booklet, "How to Plan a School Workshop."

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Only ATKINS makes "Silver Steel" saws

Of all fine saws—
the finest are
"Silver Steel"
saws

PEDIGREED!

America's finest saw—the champion of champions—Atkins No. 65—is the proud sire of a pedigreed son—Atkins Jr. -65.

Here is the ideal saw for school training shops! . . . Atkins Jr. -65 has a genuine *"Silver Steel"* blade only 16 inches long. It has the same type Perfection Handle, the same taper grinding, the same high polish, the same precision balance that have made Atkins No. 65 the prime favorite with careful craftsmen everywhere!

Not only students with small hands, but adults as well, will welcome Atkins Jr. -65 as a light-weight, easily-handled, accuracy-plus instrument for fast-cutting, no-fatigue workmanship.

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ATKINS

New!

Self-centering chuck on the Stanley No. 923 Bit Brace

With a NEW *self-centering* chuck, the Stanley No. 923 Bit Brace is ideally suited for use in school shops. Just drop the bit into the square socket, tighten the chuck and the bit automatically centers itself. Securely seated in a square steel socket it's ready for any boring job. Carefully designed, simply constructed, the NEW chuck on the No. 923 Bit Brace makes centering the bit easy and positive for your students. Makes your teaching easier, too.

Train students with Stanley. Be sure to include the No. 923 Bit Brace with the *self-centering* chuck and other Stanley Tools on your Fall requisition. Stanley Tools, Educational Dept., 112 Elm Street, New Britain, Connecticut.

OTHER FEATURES INCLUDE: Steel clad, ball bearing head with bronze bushings. Cocobolo handle and head. Strong, sturdy, all steel box ratchet. Universal jaws. Takes all square taper shank bits and round shanks from ⅛" to ½". 5 sizes—6" to 14" sweep.

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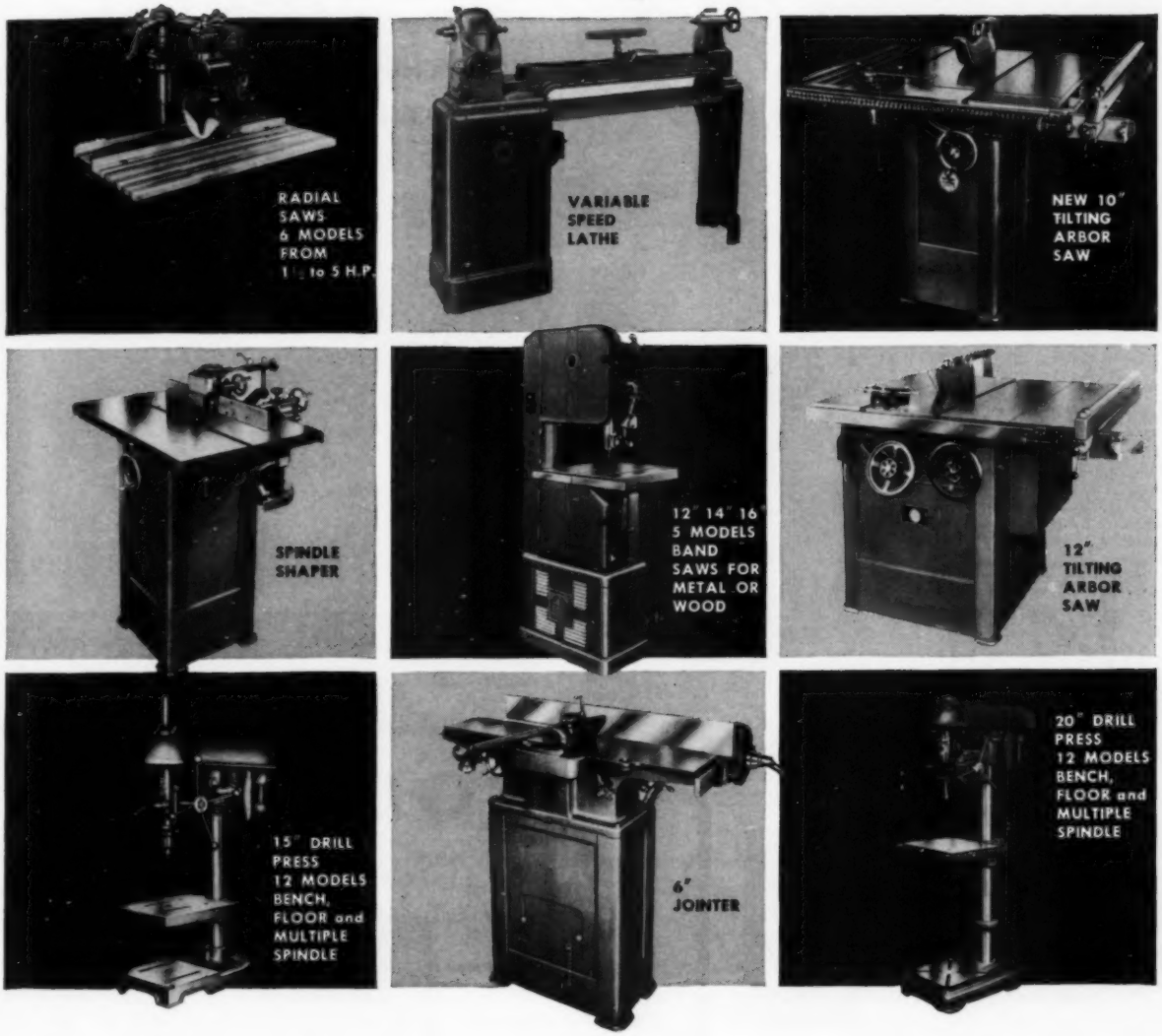
A model to fit your needs...


RADIAL SAWS 6 MODELS FROM 1 to 5 H.P.
VARIABLE SPEED LATHE
NEW 10" TILTING ARBOR SAW
SPINDLE SHAPER
12" 14" 16" 5 MODELS BAND SAWS FOR METAL OR WOOD
12" TILTING ARBOR SAW
15" DRILL PRESS 12 MODELS BENCH, FLOOR and MULTIPLE SPINDLE
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DRILL PRESSES • BAND SAWS
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PLAINFIELD, NEW JERSEY

There's a Walker-Turner machine for practically every metal and woodworking requirement—each designed to meet the special needs of industrial arts and vocational schools.

For the woodworking shop, Walker-Turner Radial, Tilting Arbor and Band Saws . . . Jointers, Spindle Shapers, and Lathes are *safety-engineered,* help students learn faster. And like the drill presses, radial drills and other metal working machines in the complete Walker-Turner line, they quickly justify their moderate cost.

Put Walker-Turner functional design to work in your school shop. See what a difference it makes in the quality of student's work . . . in machine *maintenance* costs. Send today for new catalog. Address Educational Department IA9.

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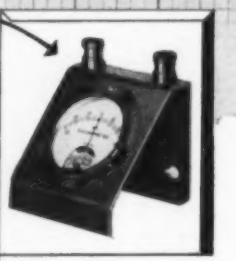
Weston

ELECTRICAL INSTRUMENTS MEET EVERY INSTRUCTION NEED



Your own introduction to elementary electricity may have been made with a Weston Model 375 Medium Sensitivity D-C Galvanometer. Rugged, inexpensive, excellent for student use.

For general testing and laboratory work, Weston Model 528 Miniature Portable A-C Instruments combine dependability with relatively sensitive operation. Model 489 Companion D-C Instruments also available.

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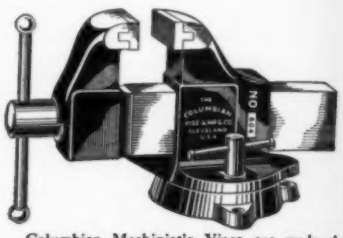
The complete line of Columbian Vises is designed to excel in its field — all are made to the same high standard of engineering and workmanship. A vise for every need and purpose.



Columbian Machinist's Vises are made of malleable iron castings, guaranteed unbreakable, and designed to provide accurate, dependable equipment for school and industrial shops. All standard types.

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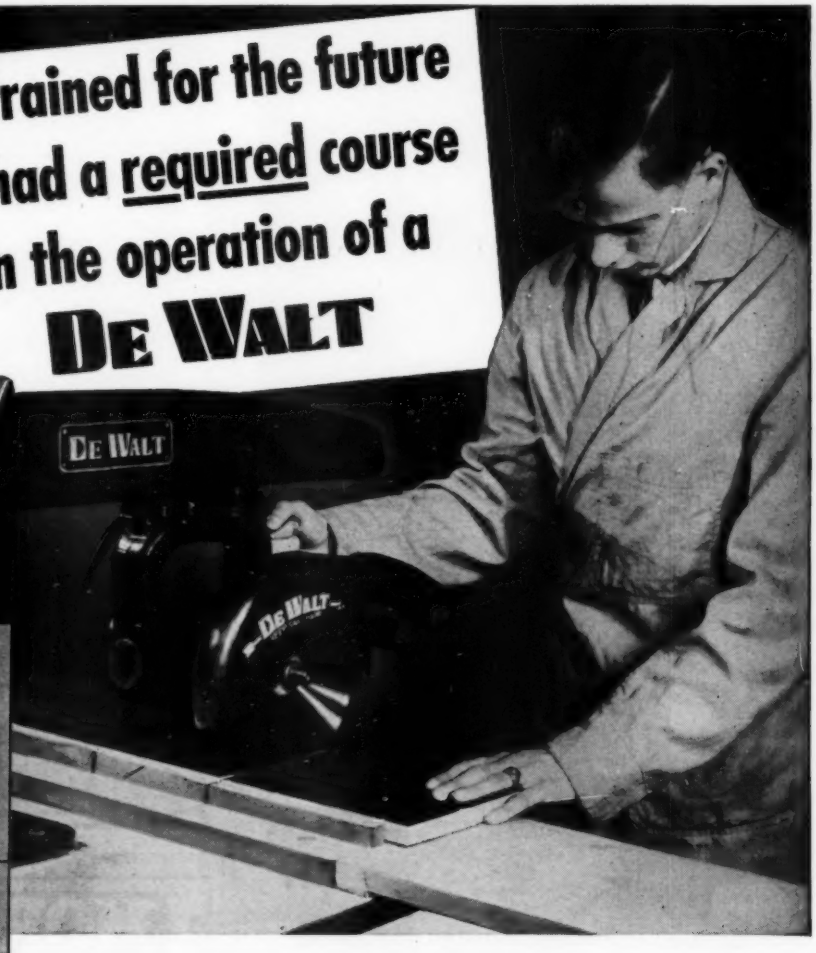
This "Oliver" Mortiser is ideal for use in the school shop. Cuts smooth, clean, accurate mortises. Handles an extensive range of work. Its compound table is adjustable to any angle. Adjustments at motor-head and table are made quickly. Has latest safety features. Precision built to give years of dependable service.

Write for Bulletin 194-D.

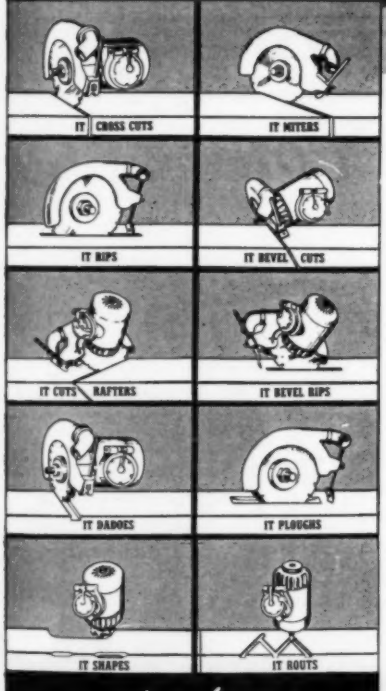
OLIVER MACHINERY COMPANY

GRAND RAPIDS 2, MICHIGAN

He's really trained for the future when he's had a required course in the operation of a DE WALT



DE WALT is a complete shop in itself



...and with proper tools makes any cut possible!

After the student has completed his basic training course in the use of hand tools, he should have a required course in the operation of De Walt.

Knowing how to make the fullest use of this flexible, easy-to-operate machine, will give any student a head-start as he prepares for tomorrow's industry.

When he leaves school he will be fully acquainted with a machine that is destined to occupy a prominent place in tomorrow's industry. The perfection of the De Walt saw has created new methods in cutting wood, making obsolete old-style equipment previously use.

Ask a nearby De Walt dealer about two De Walt 16MM movies—one showing the general application of De Walt—the other showing modern, pre-cutting techniques developed during the war. Write for catalog.

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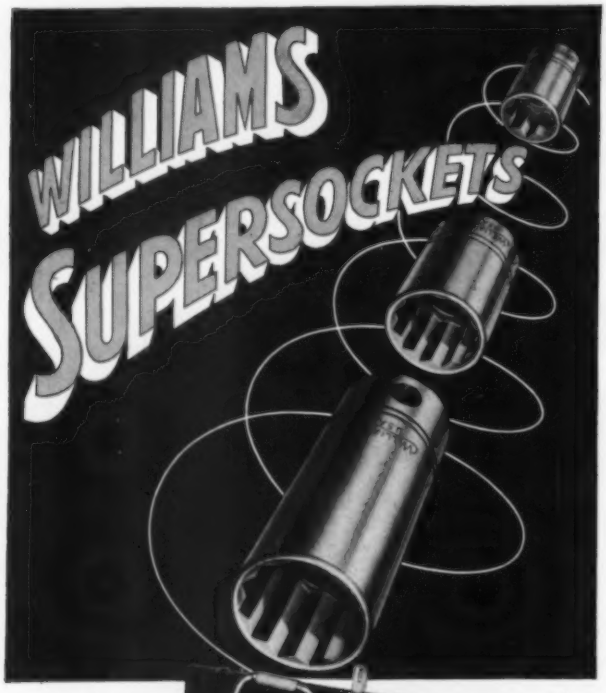

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15 Attachments

BRING PROFESSIONAL SKILL TO THE YOUNG MECHANIC

● The engineered flexibility of Williams "Supersockets" permits the combining of sockets, handles and accessories to create special wrenches for special jobs. Available in five different patterns, with drives ranging from 1/4" to 1" square, and with socket openings from 3/16" to 3-1/8". Sold by Hardware Dealers, Automotive and Industrial Distributors. Write for "Supersocket" Catalog, A-50.

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An "Extra-Value" Variety Saw

WALLACE NO. 11 UNIVERSAL SAW

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● EXTRA VERSATILITY, SAFETY, ECONOMY

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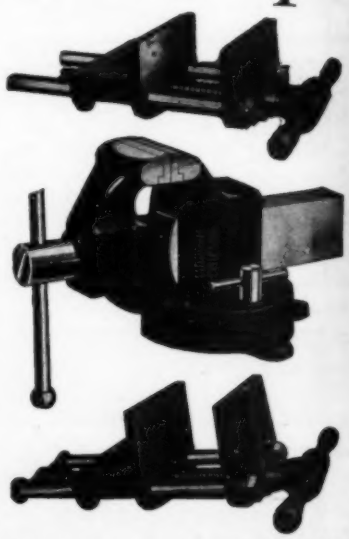

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"YANKEE" Spiral Drivers & Push Drills TEACH MOTION-SAVING

Help students do better work with fewer motions. Just a simple push with a "Yankee" Spiral Screw Driver spins the blade and drives the screw. No heavy wrist work! A flick of the shifter gives driving or drawing action, or sets spiral rigid. Pilot holes made easily with a "Yankee" Automatic Push Drill. Spring brings back handle after every push; reverse-spins drill point to clear out chips. Magazine handle holds 8 points, 1/16" to 11/64". Write for free "Yankee" Tool Book.

No. 130A Spiral Driver

No. 41 Push Drill

NORTH BROS. MFG. CO.
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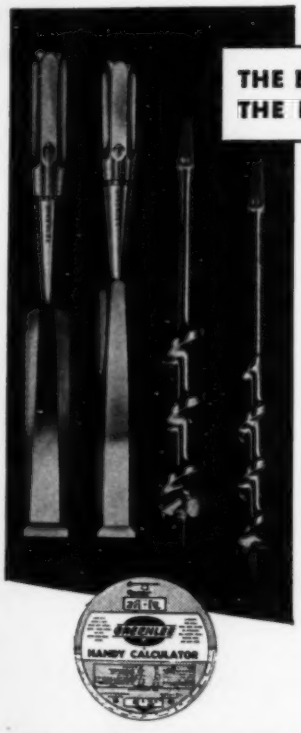

THE BEST OF TOOLS... FOR THE BEST OF SHOPWORK

Greenlee Chisels, Gouges, and Auger Bits help students get the feel of true craftsmanship easier and faster. For they are tools of highest quality to assure clean, accurate results. New GREENLEE Chisels with Hard-Wear Handles, illustrated, have long-lasting blades with fine-cutting edges. And the handsome new transparent handles are tough, weather resistant, safe. GREENLEE 22 Solid Center Auger Bits are induction heat treated for true uniformity to assure sharp cutting edges, smooth, easy action for clean boring. And each GREENLEE 22 is "Plastic-Sealed" to reach your shop in perfect condition. Get GREENLEE for top quality.

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PORTER-CABLE Guild SANDER

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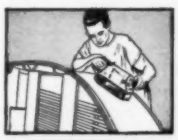
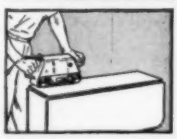


Speeds Paint Removal . . . Used to be tough and messy to remove paint and varnish — not any more! It's easy with this powerful motor and high belt speed working for you.

Plane-Sands Faster . . . Another job made easy. The Guild A-2 Sander is perfect for taking off stock to close dimensions.



A Whiz at Preparing for a Finish . . . Always a uniformly fine, velvet-smooth surface. No waves or swirls — levels perfectly—cleans blemishes! And that's not all!

Speeds Screen, Sash and Door Fitting . . . And does a workmanlike job that will amaze you.

• Guild Sander does that job *fast* without hand-sanding drudgery! No bearing down — the powerful motor insures effortless, efficient cutting. So light, so perfectly balanced, Guild handles easily in *any* position. High speed abrasive belts have a variety of grits for work on wood, composition, plastic, metal, glass. Handy bench stand (extra) converts Guild Sander to a tool grinder—and to a machine for truing and smoothing butt and mitre joints.

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See your dealer for free demonstration. It'll open your eyes. Send in coupon today.

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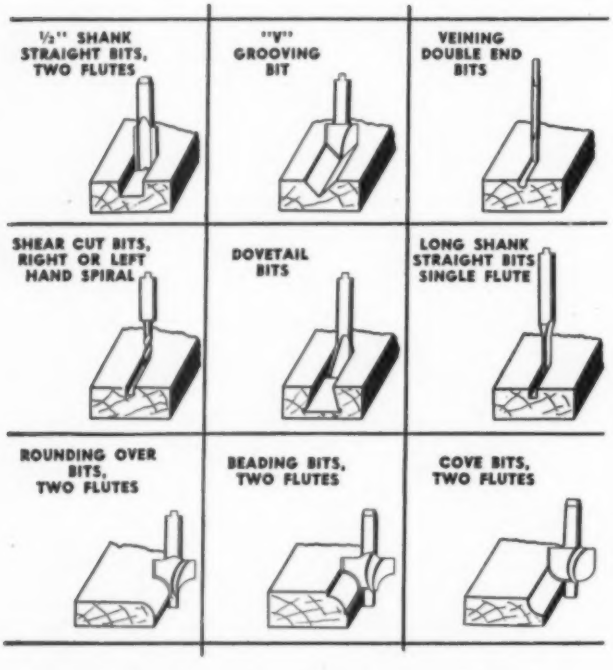
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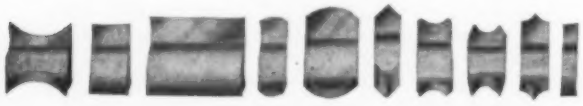
LONG SHANK STRAIGHT BITS SINGLE FLUTE
ROUNDING OVER BITS, TWO FLUTES
BEADING BITS, TWO FLUTES
COVE BITS, TWO FLUTES

A FEW OF THE MANY STANLEY-CARTER SHAPER CUTTERS



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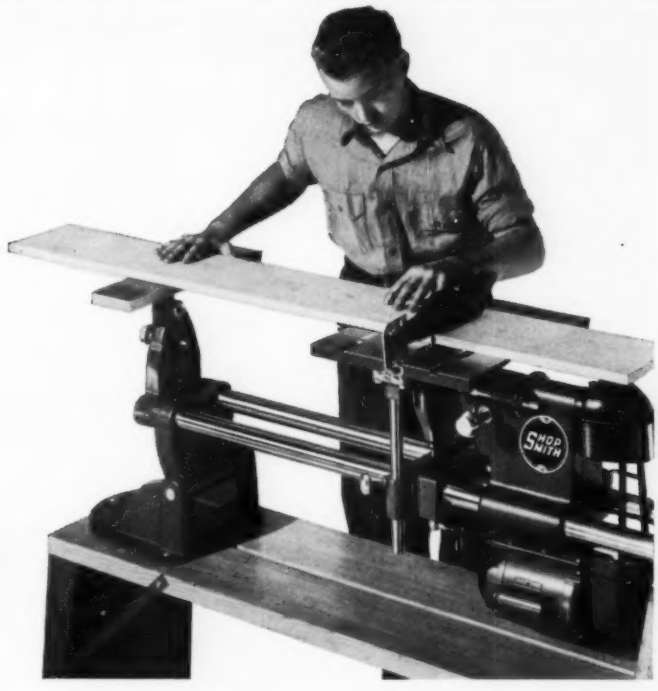

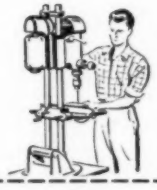

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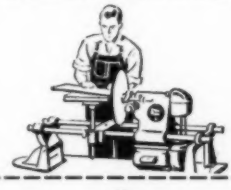

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OCTOBER . . 1950

Starting a Class in Woodworking

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Minneapolis, Minn.

That first step — or one's first airplane solo — or even that first date had numerous apprehensive situations. No doubt, all of these take a back seat at the time the industrial-arts teacher begins his first class. Getting started in the correct way is an essential to good teaching. Once the art of beginning a new group of students in a subject area has been mastered it becomes almost second nature with successive classes. This article is written expressly for the beginner — for the shop teacher who is putting theory and practice teaching experience to the test for the first time. In no way is it to be presumed that the methods suggested and outlined here are the "one and only" procedures to be followed. Numerous methods are used by various teachers and all of them gain certain desired goals. The important factor is to have a plan of teaching in mind and to follow it.

Before beginning the actual teaching there is much preliminary work to be done. Industrial-arts classes teach certain basic skills or items of information.

No matter what the course of study — no matter what the methods of teaching employed — no matter what textbook, or no textbook, may be used — no shop teacher can escape organizing his work on the basis of some plan of "fundamental learning units."[1]

These items are best listed on a *project check sheet* such as is shown in Figure 1, to ascertain just what teaching units are included in a particular object. The list of processes is shortened here to conserve on space but any teacher can analyze his projects and determine just what teaching units are involved and are, therefore, a part of the check sheet list. Numerous texts give similar lists. The "Standards of Attainment in Industrial Arts Teaching" pamphlet previously cited gives a complete list of such units for a number of subject matter areas in industrial arts.

A Progress Chart, Figure 2, facilitates teaching since it motivates pupil activity. A student is credited with accomplishing a specific unit of work as it is completed. Visual evidence of progress as to the number of units covered prompts continued striving to learn new things.

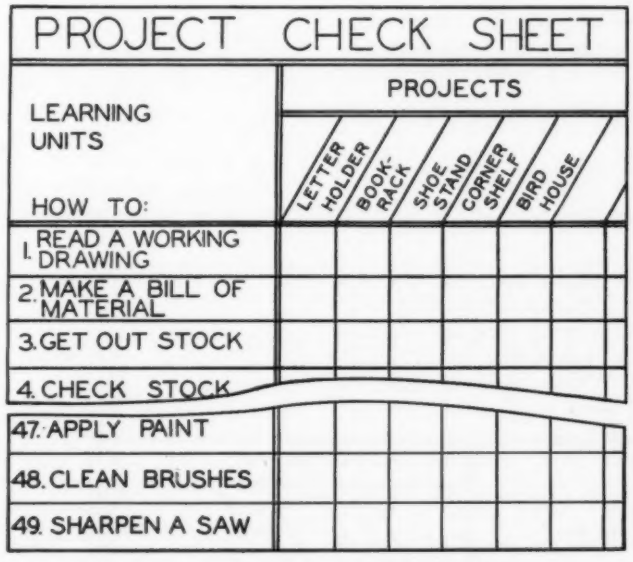


Fig. 1. Starting a class in woodworking

The plan of procedure, Figure 3, is an effective aid to industrial-arts teaching. Much good teaching may be accomplished by its use. Pupils are taught to plan a task efficiently and write down their intended activity. The bill of material may be made an integral part of the plan of procedure. The column headed *date* is to be filled in as the student completes each step. In this way a more accurate record may be kept of the actual time it takes to complete a project. Sometimes a period or so may be used to carry on class discussions, give demonstrations, or to administer tests. Such time should not be charged against the work time on the project. A mark, such as a star or circle, is placed at certain strategic steps in the *plan of procedure*. These marks indicate places where the student is to obtain from the instructor an appraisal of his work or to check what has been done.[2] This procedure affords an excellent opportunity for the instructor to keep a close check on his students' work and to do any corrective teaching that may become necessary.[3]

The teacher's job plan, Figure 4, is an

[1]American Vocational Association, "Standards of Attainment in Industrial Arts" (Washington, D. C.: American Vocational Association, 1934), p. 7.

[2]W. Carlisle Anderson, "Check Points," INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, XXXIV (Sept., 1945), pp. 301–303.

[3]Henry C. Morrison, *Teaching in the Secondary School* (Chicago, Ill.: The University of Chicago Press, 1926), p. 431.

over-all coverage of the specifications, processes, and assignments to be derived from the project. A convenient device for the instructor is that of gluing a blueprint to one side of a piece of cardboard and putting a job plan on the other. A coat of white shellac over this makes a serviceable teaching instrument which is compact and is easily stored or filed. This job plan is a guide to the instructor in setting up his *lesson plan*. A *job plan*, no doubt, will be used several times by an instructor whenever he teaches a given project. His lesson plan will vary according to the composition of his classes but the job plan will remain somewhat the same whenever and wherever used.

There are numerous specific reasons for intelligently planning a lesson.[4] All purposeful teaching originates from a carefully prepared lesson plan. The beginning teacher will need to spend time to plan his work in advance of the actual period when the teaching occurs. No better preparation may be taken to insure the correct formation of habits, attitudes, skills, ideals, and accomplishments than that of making a workable lesson plan. Perhaps there is no greater diversity of opinion on what a teaching device should contain than there is on the lesson plan. Those who use them have, of course adopted a form which seems to serve its purpose well.[5] Such form may differ widely in many respects.[6] The actual form of the lesson plan is not of extreme importance. Its utility and adaptability is the important thing. For that reason the lesson plan presented here is only suggestive. A lesson plan of this type is useful for these reasons:

1. It is brief.
2. It is in tabular form.
   a) Easy to follow.
   b) Expedites a quick last minute perusal.
3. It is elastic.
   a) May be changed to fit numerous lessons.
4. It is inclusive.
   a) All the factors of a well-planned lesson are included.

Letter Holder Job Plan

Specifications: This project is to be made of white pine, sanded smooth, assembled with brads and finished with two coats of paint. The pupil may add an appropriate design, initial, or trim if he so desires.

Learning Units	*Plan of Procedure*
How to:	1. Read the working drawing
Read a working drawing	2. Make out a bill of material
Make a bill of material	3. Get out stock
Plan the procedure	4. Check stock
Get out stock	5. Plane surface true for back
Check stock	6. Plane an edge true
Measure with a rule	7. Plane an end true
Lay out curves with dividers or a compass	8. Cut to length
Use coping saw	9. Plane end square
Fasten stock in a vise	10. Cut to width
Adjust a plane	11. Plane edge true
Plane a surface true	12. Plane to thickness
Plane an edge square with a face	13. Square the front piece
Plane end grain square	14. Square the bottom piece
Square a board	15. Lay out curves for corners
Use a backsaw	
Trim or pare with a chisel	16. Saw corners with coping saw
Drill holes in wood	17. Trim corners with chisel
Use a bradawl	18. Sand pieces smooth
Sand a surface smooth	19. Lay out holes for nails (Drill holes if in hardwood)
Sand edges smooth	20. Assemble pieces
Sand end grain	21. Apply primer coat of paint
Sand curves smooth	22. Sand smooth
Drive and draw nails	23. Apply paint
Use a nail set	24. Sand smooth
Apply paint	25. Apply paint
Clean and care for paint brushes	26. Apply design

Related Assignments:
- How a tree produces lumber
- How sandpaper is made
- The story of paint
- Other appropriate text material

Testing:
- Check each pupil's work against the score card for accuracy of skills.
- Administer written objective test over related information, demonstrations, and desired outcomes.

Figure 4

[4]William H. Burton, *The Guidance of Learning Activities* (New York: D. Appleton-Century Company, 1944), pp. 378–379.

[5]Emanuel E. Ericson, *Teaching Problems in Industrial Arts* (Peoria, Ill.: Chas. A. Bennett Co., Inc., 1940), pp. 81–89.

[6]Burton, *op. cit.*, pp. 383–384.

PROGRESS CHART
EAST JUNIOR HIGH SCHOOL
GRADE VIII

NAME	HOW TO: READ A BLUEPRINT	MAKE A BILL OF MATERIAL	GET OUT STOCK	CHECK STOCK	MEASURE
☒ GOOD WORK ☐ FAIR WORK					
GLEN GARRANT					
KEN CARSON					
ROBERT COONS					
EARL LAWSON					

Fig. 2. The progress chart

PLAN OF PROCEDURE

NAME_____ PROJECT_____

STARTED_____ FINISHED_____

STEP	PROCESS	DATE

Lesson plans have different bases. All of them cover some unit, block, lesson, or topic of work or subject matter. They may be based on aims or objectives, projects, units, or skills.[7] The project may well serve as the basis of a lesson plan since its making is the prime feature of industrial arts in its appeal to the student; especially when the entire class begins its work on the same project and will be working along together for a certain length of time. Later in the school year when individual students choose a project of their particular liking upon which to work the basis for the lesson plan may be changed.[8] Aims and objectives of industrial arts are a vital part of this lesson plan and the skills and desired outcomes have an important place in the structure of it. Regardless of the form or structure no lesson plan is any better than the results it obtains.[9] A measure of the success of your teaching will indicate the usefulness (or uselessness) of your plan. Lesson plans based on projects must of necessity cover more than one class period since few projects, if any, are completed in that time. This feature is an important time saving asset in this type of plan.

Figure 5 shows a Lesson Plan for the project chosen as the basis for this discussion.

It is assumed for the purposes of this discussion that a group of twenty eighth-grade junior high school pupils is beginning this class. It is further assumed that this is the first organized shop class of any type in which these students have been. The class is meeting in a shop prepared for teaching woodwork with workbenches and vises, the usual tool cabinets, bulletin boards, a finishing room, and a library or book corner. A class period of one hour length for five days a week is assumed. This meeting time may not agree with the daily schedule in many schools but the work done may easily be adjusted to fit the time any particular class may spend in the shop each week.

The basis for choosing a beginning project includes these factors;

1. The project must contain desirable units of instruction as shown by the project check sheet.
   a) This includes information units as well as manipulative units.
2. Project should be useful and desirable.
3. Difficulty of construction of the project should be suited to the class ability.

The letter holder, Figure 6, on which this discussion is based makes a suitable beginning project. (One similar was the author's first project in a woodwork class and still serves its purpose.) Many times a beginning teacher is at a loss to know how to answer those inevitable remarks when a new project is started such as, "We already have one of those at home," or, "My brother made one of those two years ago." The teacher can always suggest a second one may be used in another place at home, or, it may serve as a gift, or, it may be made and left in the shop as a model for future classes.

The over-all scheme of beginning the class in woodwork on this project will follow this basic outline:

1. Introduce the project to the class.
2. Discuss its use, construction, and finishing.
3. Demonstrate the learning units.
4. Direct individual activity.
5. Check construction and completion of the project.
6. Test the learning connected with the construction of the project and the related information.

The instructor should have his shop clean and neat before the students arrive. Blueprints should be available. Tools are to be ready and bench drawers cleaned. Administrative procedures such as tool checking, payment for materials used, pupil-shop personnel system should be planned and organized. These factors, while extremely important, are not included in this discussion.

Usually the process of familiarizing a new class with shop rules and customs, checking roll, assigning lockers, and other preliminary routine matters does not require all of the first class period. It is well if such is the case since the time remaining may effectively be used in presenting the project to the class.

Arrange the students in an orderly manner around the demonstration bench. Hand out blueprints of the letter holder. Have each piece of the letter holder made separately without paint on them ready for use in your discussion as well as a completely finished project.[10] Tell the class what kind of wood is to be used. Show how dimensions on the blueprint agree with measurements of the pieces and the finished project. Discuss the placing of a design or initial on the front. On the *progress chart* show them how many operations will be learned while making this item.

Explain the purpose and manner of filling out the plan of procedure. Show the class your plan for the project. It is a part of the job plan. Pass out blank *plan of procedure* forms for them to fill in as steps are determined during your demonstration. The time factor will guide your

[7]Ericson, *op. cit.*, p. 90.
[8]John A. Hockett and E. W. Jacobsen, *Modern Practices in the Elementary School* (Chicago, Ill.: Ginn and Company, 1938), p. 67.
[9]Morrison, *op. cit.*, p. 407.

Lesson Plan for Letter Holder

Approximate dates .....19..to.....19..

Objectives

1. To create a spirit of co-operation and helpfulness in a group situation
2. To develop an orderly method of accomplishing a task
3. To develop elementary skills in the use of the hand woodworking tools required to complete this project

Materials Necessary

20 pcs. white pine ½ x 6 x 5 in. Brads
20 pcs. white pine ½ x 6 x 4 in. Paint
20 pcs. white pine ¾ x 6 x 2 in. Sandpaper

Before Class Activities

Cut up the pieces of lumber for the class to use
Tear sandpaper into quarter sheets
Arrange brushes

Class Procedures

1st day Introduce class to shop and equipment. Demonstrate to Step 12. Give out information sheet on lumber.

2nd day Demonstrate steps 13 to 17. Show class how to tear sandpaper. Give text assignment.

3rd day Demonstrate Steps 17 to 24. Explain rest of finishing process. Give text assignment.

4th day Let class work. Check on reading of assignments.

5th day Let class continue work. Give written test at close of period.

Special Attention Items (In this space the instructor writes in the matters which definitely need his attention. If he will write them in during or at the close of a period it will recall them to his attention the next class period. These items will be such things as, "Robert needs help to work his vise properly"; "Show Vernon how to hold a plane"; "Arrange seating during demonstration so that Glen can see better"; "Check to see if Kenneth knows how to find information in his text." These little items when noted and consequently attended to help an instructor a great deal to insure the success of his teaching.)

Assignments

(Write in this space the pages and units covering information units and operation units about the factors of this lesson such as — planes, coping saw, chisels, backsaw, sandpaper, paint, lumber and the like. Arrange these assignments according to the days of the lesson.)

Figure 5

[10]David Snedden, William E. Warner, and others, *Reconstruction of Industrial Arts Courses* (New York: Bureau of Publications, Teachers College, Columbia University, 1927), pp. 68–69.

activities a great deal but if time permits you might advantageously pass out some related imformation sheets the first day — a sheet on "How a Tree Produces Lumber" for example, or "Common Kinds of Wood." Augment this by assigning a suitable amount of material in their texts on the tool processes involved in this project. Take care not to assign too much reading this first day. Sufficient time remains during the school term to assign the necessary reading.

The second day the class meets be prepared to begin actual demonstrations. Again show the pupils your *plan of procedure* and note the first step is, "Read the Working Drawing." Have the pupils write this on their blank sheet as the first step. It is well to have some extra blank forms since some pupils probably will not have with them the one you handed out the previous day. Review with a few pertinent questions the basic information about the size of the pieces of the letter holder to make sure the class understands how to get dimensions from the blueprint. All the way through your demonstration make it a point to explain a step and have the pupils write it on their plan before you demonstrate that item.

One practice which will serve a teacher well is to have a small tool cabinet near the demonstration bench with tools to be used only by the instructor. In this way tools stay sharp longer and may be kept in good condition as the need arises. Effective demonstrations are given only with properly conditioned tools.

Notice step two is "Make Out a Bill of Material." Show the class how to determine the size and number of the pieces of wood needed for this project. Have them write this in on the back of the *plan of procedure* in the form provided there for it. Explain to them the necessity of having some waste stock for squaring purposes. Notice the next step is "Get Out Stock." Demonstrate the use of a pencil and square to lay out lines for sawing. Demonstrate how to saw with the rip- and crosscut saws. For this first project much time will be saved and congestion in a strategic working area will be averted if you cut out the pieces of stock for the students and have them ready for them to begin work. If they need a second piece they can cut out their own since it is unlikely too many will be doing this at the same time. On the next project the student can get experience in getting out his stock. Explain how and why a good workman should take a few minutes to check his stock before beginning to work.

Show the class how to place stock in a vise, and how to adjust and use a smoothing plane. Then demonstrate squaring up a board by planing a face, a side, and then an end true on the piece which is to be the back. Then square the piece to length, width, and thickness. Plan to have enough waste stock so a demonstration may be given on how to use the backsaw in cutting to length. Use the marking gauge in laying out the line for planing to width and thickness. Show the class how the hand and a pencil may be used as an approximate marking gauge. Follow the same demonstration units in squaring up the front and bottom pieces.

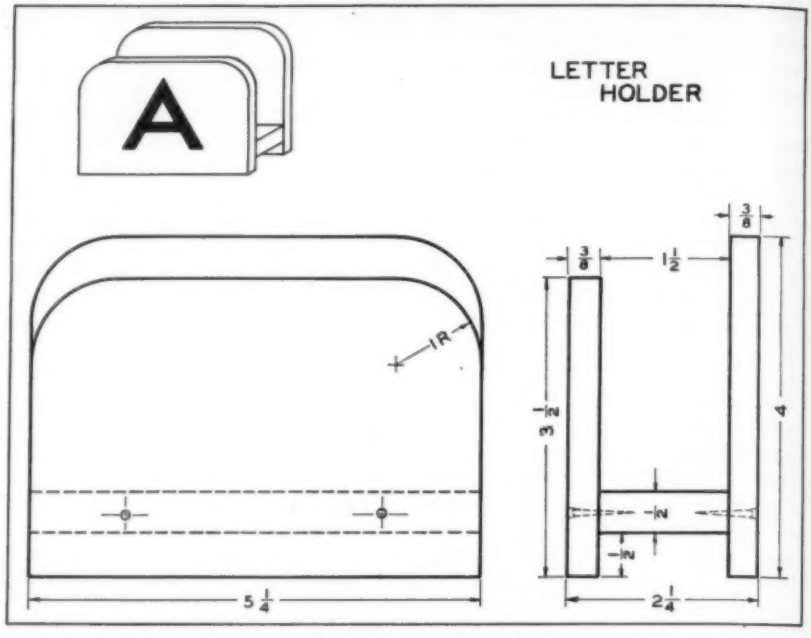


Fig. 6. Starting a class in woodworking

Next demonstrate how to lay out a curve with dividers or a compass. Saw out the curve with a coping saw. Take special care to explain how stock should be held in a vise when sawing with a coping saw. Try to encourage thinking by asking leading questions as to why corners on the back should be cut first. Attempt to draw out the reply that if a bad cut is made the piece could still be used for the front and the original piece for the front could be used by someone else.

Common sense should be used to determine how much demonstration work to

SCORE SHEET FOR LETTER HOLDER			
	GOOD	FAIR	POOR
*SIZE OF PIECES	EXACT SIZE	VARIES 1/16"-1/8"	VARIES OVER 1/8"
*SQUARENESS	EVERY PIECE SQUARE	FEW PIECES OUT OF SQUARE	FEW SQUARE PIECES
*CORNERS	EXACTLY ROUND	FAIRLY ROUND	IRREGULAR
*SMOOTHNESS	EACH PIECE SMOOTH	MEDIUM SMOOTH	PIECES ROUGH
*ASSEMBLY	ACCURATELY DONE	ALMOST SQUARE AND EVEN	NOT SQUARE OR EVEN
FINISH COAT	FINE SMOOTH	ROUGH IN PLACES	COARSE, ROUGH, BRUSH MARKS
*CHECK THESE ITEMS BEFORE PAINT IS APPLIED		TOTAL COMPOSITE GRADE	

Fig. 7. Score sheet for letter holder

give in one day. If your demonstrations have moved along quickly and a fair amount of time remains let the students go to their benches and start work. They are eager to "make shavings" and less disciplinary trouble will arise if they can get underway quickly at their benches. If just a short time remains until the end of the period then continue showing them the operations. The next day let the pupils begin to work at the start of the period.

When the students have worked up to the current demonstration call them together for additional instructions. Some slower students will not be entirely ready but have them come anyway. Later you can help them along. If one or two boys are extremely fast ask them to help a slower student until a few more are ready for new demonstrations.

Demonstrate how to pare corners with a chisel. Stress the safety factor with this demonstration. Show them how to sand the pieces smooth. Demonstrate the assembly procedure. This entails laying out places for the brads, how to use the bradawl, how to hold a hammer, and how to set nail heads below the surface. If you are using a wood that splits easily a demonstration on drilling a hole for nails should be given. This would include an introduction to the brace, how to put a bit in the chuck, how to remove the bit, and how to drill a hole.

Let the pupils work until they have caught up with the current demonstration and then show them how to apply a primer coat of paint and explain how this coat is sanded by doing it on a previously prepared piece with a primer coat on it that is dry. Demonstrate how to apply the next coat of paint over the sanded surfaces and then explain the remaining steps of the finishing process. Stress the care of paint brushes. Show them how to clean and store a paint brush. From the very first insist that paint cans can be kept clean around the top and the outside. Messy paint cans are not inducive to good work.

Students who want to paint an initial or design on the front may be shown individually or in groups how to use a stencil or how to lay out a design directly on the wood and paint it in.

While the students are working, the instructor should not stand idly by waiting for his next demonstration time. Instead, he should be helping out the pupils when they need it, doing corrective teaching where the first demonstration was not adequate. From time to time as students finish certain steps take them to the progress chart and give them credit for good work done. A device to create a desire to do good work is to make a square in the space when just passable work is done but later put an *X* inside the square when evidence of a better quality of work on that step is shown. If good work is done at first, of course, give the better mark.

On the first day when the project is discussed, the instructor should tell the class that a grade will be given when the project is completed. The grade will have two main parts. One part will be on their workmanship and the other part will come from a written objective test over the demonstrations given and the assigned reading material. The test should be given to the entire class at one time. Since this project is rather simple the pupils will probably finish working about the same time. Those who do finish much ahead of the others may be allowed to begin their next project and take the test when the rest of the class is ready.

The type of test to give and the way the project is graded depends a great deal upon the class, the texts used, and the instructor. For the most part, however, the grade on the project itself should be determined by checking each student's work while he is watching, against a score sheet such as the one shown in Figure 7.

No sample test is presented here but it should cover the reading material, information, and instructions given during the demonstrations, and any other outcomes desired from this project.

As the pupils finish this project and are graded on their work the industrial-arts teacher can see the path of his teaching endeavors. He presented a lesson by means of carefully prepared steps, he did corrective teaching when his observations showed such correction was necessary, and then he tested the class over the material covered. If certain units need to be stressed further they may be worked into future lessons and projects. In this way he worked to attain the objectives of his plan. He guided students to help others while they were working. He helped them plan an orderly method of doing a task and then directed their work through the plan. His demonstrations and directions developed certain basic elementary skills.

With the careful preparation and practices discussed here efficient, effective, and enjoyable teaching will result.

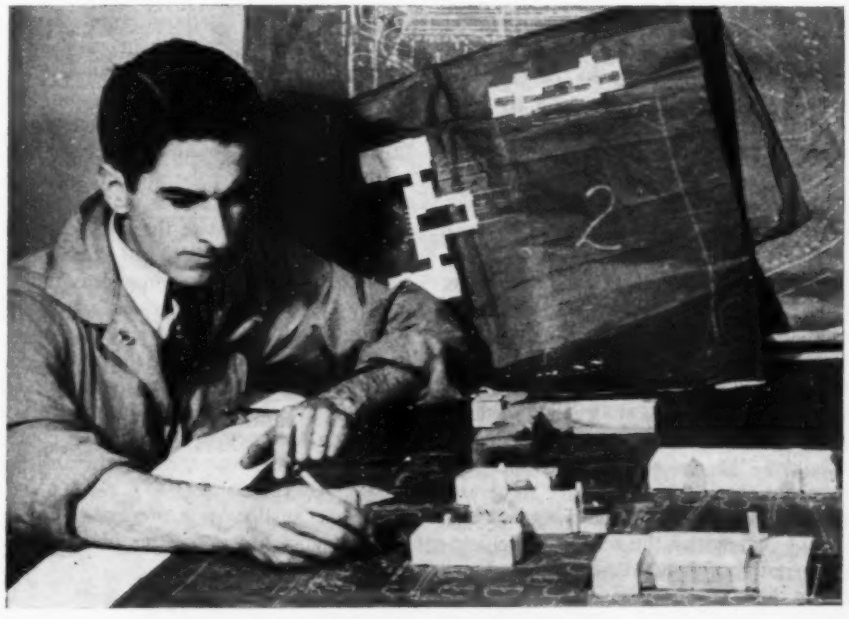
Veterans' on-the-job training enrollments under the G.I. Bill and Public Law 16 have been dropping steadily for the past 40 months, moving downward from a peak of 720,510 at the start of 1947 to 258,457 by May 1, 1950.

* * *

In 1949, 269,000 pedestrians were injured in the United States. — *The Travelers*, Hartford, Conn.

* * *

Male drivers in 1949 were involved in more than 90 per cent of all U. S. automobile accidents. — *The Travelers*, Hartford, Conn.



Building school dioramas

Photograph submitted by Robert D. Helsby, industrial arts instructor, State Teachers College, Oswego, N. Y.

The Role of the T. and I. Co-ordinator

WALTER J. KNYSH
Okemos Consolidated School
Okemos, Mich.

If the ultimate goal of any program of guidance is to "help youth adjust," the trade and industrial co-ordinator can certainly feel secure in knowing that he is a vital part of the guidance movement. "Who is the industrial co-ordinator, what does he do, and why?" are legitimate queries of those who really don't know! For those who feel they know, enviously eyeing that long title, muttering "pretty soft, no regular classes, roams around all day, gas allowance, better pay, nice office, where does he get that stuff — etc.!" perhaps this article will give an answer to these questions. Rest assured, fellow teachers, a co-ordinator does not last long if he merely roams and shows no results!

Analysis of the Trade and Industrial Co-ordinator's Job

The co-ordinator organizes and supervises work experience programs, such as related to trades and industries; collects and organizes the teaching material for these courses; endeavors to interest the people of the community in the activities of such a program; promotes the development of social attitudes and work adjustment of the students; arranges for the selection and employment of students commensurate with their abilities and ambitions, utilizing counseling tools and techniques, such as tests, interviews, questionnaires, etc.; interviews personnel under whom the students will work to determine whether a proper placement can be made; interprets the program and analyzes criticisms in order to facilitate greater understanding between the student, the school, and the phase of work-experience involved; correlates the classroom activities with those in the work experience program; instructs those phases of the program which are not covered by the school curriculum; may confer with guidance director and inform him on progress of specific individuals; may confer with teachers of given students in order to clarify and objectify the ultimate aims of these students; confers with parents in regard to work-experience program for their child; consults and uses local industrial union resources in setting up and providing for a wage agreement on each specific student; establishes and maintains a correlation between the school and work experience; interprets the school to the employer; sells program to in-school personnel and teacher groups.

The trade and industrial co-ordinator has a tremendous task, as may be seen from the foregoing job analysis, and it is to this task that the balance of this article shall be devoted.

Guidance Tools and Techniques

Picking out some of the points already mentioned, and paralleling them with the task of a program of guidance services, it is quite obvious that there is a marked similarity. The method of selecting students for the program involves practically all the techniques commonly found under the heading of guidance services.

The testing program as conducted by the co-ordinator, provided such information is not available from a guidance setup, might stress mechanical aptitude and dexterity testing. The possibilities of using the interest inventories is an asset in assisting better placement of the student and should certainly not be overlooked. The use of achievement tests, or of achievement test results if they are available, helps to determine where the student is in the over-all pattern, so that he may be started from there. To indicate the possibilities of maladjustment, the use of personality scales or their results might supply helpful information for work-experience placement. Reading tests can be an invaluable aid to proper placement, and interpretation of such test results should be made early in the student's school career in an effort to catch any weakness in this area. Of course, the I.Q. measurement is another criteria used in the placement. I.Q. results, used properly, can divulge a number of important evidences necessary for proper placement.

The anecdotal record provides helpful information and should be *"objectively"* interpreted by the co-ordinator. ("Objectively" was necessary to indicate the manner in which someone else's anecdotes should be treated.) To properly write a good, short, precise anecdote requires a great deal of experience, more time than most administrators allow their teachers to have, and intelligence enough to know that the fact that "little Murgatroyed peeked at page 4 of her examination three years ago in the natural science class" is first of all, not the type of the record the word anecdote implies, and secondly, does not label Murgatroyed as a potential Public Enemy No. 1.

The use of the cumulative records as established by the guidance services division of a school are another device used by co-ordinators to help formulate a more complete picture of the student in question. Where such a record is unavailable, it is necessary for the co-ordinator to set up a form and personally interview the people who would best know the student, and could supply the necessary information generally found in the cumulative record folder. The cumulative record is a foundation upon which certain other criteria can be placed, balanced, and eventually organized to form a complete pyramid of information. Where the record has been organized and kept up to date by the guidance personnel, the co-ordinator simply uses this data, returning it when the information sought is found. Generally, such points as physical health, grades, test results, rating charts (such as personality, co-operativeness, ingenuity, etc.) home influences and co-operation, and extracurricular activities, are the data around which most cumulative record forms are built. Such information is extremely important to have and interpret before placement in any work-experience program is made. Not only can the lack of information reflect on the co-ordinator's ability to select personnel but the maladjustment and discontent usually found prevalent when improper placements are made can upset an entire program of this type.

Counseling

In as much as the focal point around which any program of guidance services should revolve is counseling, this phase of guidance requires the personal touch

which only a trained competent counselor can give! It is highly possible that the co-ordinator in his relationship with industries and trades finds the task of counseling a vital device to determining attitudes and personal qualities of the student. There is a slight difference between the counseling procedure used by the school counselor, and that utilized by the co-ordinator.

The problems of students are generally different. The student who is being counseled by the co-ordinator generally sees his objective, and frequently has made tentative decisions awaiting only placement openings, whereas, the student who has a problem but cannot objectively place his finger on it means that the counselor role requires a somewhat different technique in the counseling procedure. The co-ordinator's problems center themselves within trade and industrial boundaries and he can frequently direct the student to the information requested. The co-ordinator should be a qualified and competent counselor so that he may detect minor maladjustments which may become serious if allowed to develop too far. Such cases would always be referred to the school counselor who should determine the next move. Difficulties between the employer and student frequently make up the crux of the co-ordinator's interviews, and in such cases it is generally a matter of letting the student "talk it out." The interviews are not always with the student. Employers very frequently like to expound at great length on what the school is doing wrong and how it can be corrected. But the purpose of this study is not an "exposé" of employer's problems, however this phase of a co-ordinator's work is certainly one that requires tactfulness, and sometimes restraint — two of the co-ordinator's most valuable assets!

Occupational and Educational Information

Obviously the field of the trade and industrial co-ordinator requires that he be well versed on virtually every type of work in his area. He should have readily accessible such occupational information that covers all forms of training potentialities and this information should be available to students interested in the program. This library of information should, as far as possible, portray the true picture of each job, its requirements, advantages, and for the good of the program, play up the disadvantages in something other than footnotes written in quarter size type! "Canned" information is all right to use but right along with it, list the manufacturers or industrial concerns doing similar work, arrange a visit for the potential trainee, and let him see the actual working rather than just read the descriptions. Whenever possible, the field trip should be used to the greatest advantage, outline what it is you are going to see, see it, and then review or tell them what they have seen. Then and only then can the job placements take on a meaningful position in the all-round orientation of a student entering this program.

The position of the co-ordinator in the field of occupational information is quite similar to that of the school counselor, and he will generally use the same files for sources of information. However, he can go one or two steps further in that he can make arrangements for visits, and can supply information of actual conditions as they exist in that particular geographical area. It would be well to have the school counselor utilize the firsthand referral services of the co-ordinator, and of course, the reverse in referral services is the only key to harmonious guidance services.

The trade and industrial co-ordinator should be prepared to actively participate in any semblance of career days, business-industry-education days, or any varieties of a similar theme. Such programs are invaluable devices for familiarizing the teacher with co-ordinating problems as well as providing an opportunity to find out what each respective student's field of choice has to offer them. The co-ordinator must be open for assistance in any form recognizing that through such a technique he can activate a greater variety of selection of personnel for the various training jobs open to students. He must further make himself available to all interested groups, and provide them with the opportunity to learn what the program is *really* attempting to do, and correct many of the mistaken ideas attached to the work of the co-ordinator. His job is primarily one of public relations, and everyone of his activities should be pointed toward that goal. The more information that people have on what the co-ordinator is attempting to do, the more successful such a program will be with community growth the greatest benefactor.

Where the school counselor uses the placement factor as one of his many tools to successful counseling, the role of trade and industrial co-ordinator demands this service. It is basically the placement opening that makes available the opportunity that a co-ordinator is looking for. With the opening available, the next step involves selecting the "best person for the best training." The problem of placement here is really a reversal of the problem faced by the school counselor. The school counselor will maintain a record of the jobs available and of people available to fill them. His task is then a matter of sending the people out to the prospective employers and generally the outcome is left to the employer. The co-ordinator on the other hand selects a person to train for a respective trade, assuming that the employers will receive four distinct services.

1. Better selection of workers
2. Definite training program written to suit individual needs
3. Frees employer from necessity of furnishing *related* training
4. Assistance of trained practical co-ordinators to establish a training program and to act as consultants in carrying out the training

The afore-mentioned services are the main selling points of the work-experience program. The placement problem upon the completion of such a training program is a very simple one. Separation from the school is made and the trainee is usually put on a full-time basis, involving only time and pay rate changes. This simplifies the hiring procedure for most small manufacturing and business concerns in that the original responsibility for selection is placed on the school. Elimination of the necessity for a personnel office, records, and extra help, is accomplished in this manner. The trainee also benefits greatly in that his transition from school to the world of work has been made slowly, and hence more meaningful. The trainee then provides the very best source of material necessary for promoting the program. Follow-up surveys of the students in the field, and those who have had the opportunity for work-experience in relation to their high school programs are the types of evidences that make employers and potential employees sit up and take notice. The co-ordinator finds follow-up surveys a *must* if he is to continually provide the *best person for the best job*. Only through a survey of this type can he successfully determine the progress his program is making, its worth-whileness, and its effectiveness.

Searching for the Best Person for a Job

The employer will be the first to recognize black and white evidences which show that dollar for dollar the trained person has the greatest production potential. He realizes the cost of training employees is high, and with the peak of labor turnover at very near its highest point in several decades, the prospects of nonmigrant workers to fill those empty benches bring out a dollar sign gleam long missing in many

an employer's eyes. Active competition requires the keenness of productivity heretofore required only in prewar years. Where else is it possible to develop this keenness than on the job itself? The answer is an obvious one, and recognition of these facts plays an extremely important part in the relationship of the co-ordinator and the industries involved in the training. In placement, and in follow-up, a great deal of care must be given to selection of training locations so that there is no opportunity for exploitation of student workers. Such basic requirements as to working hours, pay rate, and training schedule high-light the contractual agreements arranged by the co-ordinator. It is his job to make sure that everyone involved thoroughly understands the contractual obligation he or she is entering into, and that each person carries it out to the best of his ability.

There are many more assumed responsibilities but in the main those mentioned constitute the duties which are of a guidance nature. In many school situations the trade and industrial co-ordinator is the only person available for counseling purposes. His training and background should be of such a nature that he can undertake the counseling of as many students as possible. In other situations where the co-ordinator is a part of the guidance services program, realization and utilization of this splendid resource by the guidance director, counselors, and faculty as well as students, are necessary to promote a program of the greatest benefit for the students. The co-ordinator assists the school and community by providing outlets and curriculum expansions heretofore unheard of. The impracticability of attempting to teach in the school itself such subjects as dry cleaning processes, dairy and food processing, refrigeration, and many others is obvious. These splendid resources are readily available in most communities, requiring only some form of co-ordination. The community profits from the co-ordinating activities in that its citizens tend to be less maladjusted in the everyday work world. Transitions have been made easier, and the relationship with the school is a much more understandable one. The school profits from the use of such a relationship by being able to provide more outlets for the ever increasing out-school interests of its students. Further, an answer to the problem of dropouts because of financial reasons has been provided for and in a great many cases, only because of an arrangement of this type do many students continue their vitally needed education. There is a direct line relationship established from school to industry with the co-ordinator explaining to each side what the other is trying to do. The opportunity to activate interest in occupational potentialities takes a natural, rather than a superficial, place in the over-all school program. The provision for actual work experience has changed the emphasis of learning for the sake of "Old Eagle Beak" to a necessary function for the student's own sake, hence relieving "Old Eagle Beak" of at least two or three of her nervous breakdowns per term.

The student is really the one who benefits the most! And going back to our original concept of *helping kids adjust*— this is exactly as it should be. Most students entering a program of this type are positively assured of a job upon completion of their training. The elimination of job-seeking and eventual job-taking just to have a job has aided considerably the reduction of cases so conveniently tabbed as *worker fatigue*. Make the proper placement, train the individual so that he knows what it is his employer is seeking, and this gadget called *W.F.* will be a thing of the past. No worker is content with a series of conflicting, unhappy production experiences. The co-ordinator realizes this and attempts to make the most suitable placement of his students. The student who profits by this training experience is certainly less likely to become a *size 52 jumper and a size 2 hat* than his counterpart of pre-co-ordinated school days.

Vitalized Teachers' Institute

LEROY E. CHARLICK
Fordson High School
Dearborn, Mich.

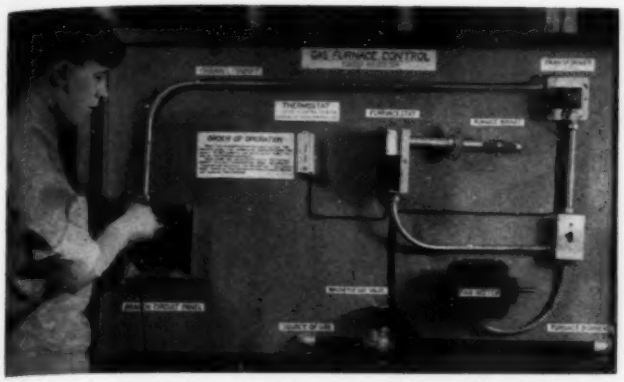
Dearborn's industrial education teachers were hosts last October to five hundred vocational and industrial arts instructors of the Detroit area. The occasion was the fall meeting of the Michigan Industrial Education Society. Its favorable reception tends to promote further a new type of teachers' institute.

In 1948, Roland Fraser, as chairman, made a radical departure from the usual offerings of *Institute Day*. His October Fair, at the Chadsey Trade School, Detroit, was so enthusiastically received that plans were immediately begun to perpetuate the pattern in the 1949 meeting. The results have been so gratifying that those who attended this Second Annual October Fair heartily recommend it to similar groups of industrial arts and vocational teachers everywhere.

The theory behind teachers' institutes is usually the same in all localities. Schools are closed to permit teachers to attend meetings where they can discuss common problems dealing with the furthering of educational techniques. It is hoped that the teachers will return to their classrooms from the institute, imbued with new ideas, knowledge, and inspiration that will enable them to do a better job of teaching. Unfortunately, many of these meetings have deteriorated to the point where those attending merely listen to long-winded speeches and a few halfhearted round-table discussions.

The very basis of industrial and vocational education calls for active participation of every individual in the class. So, it was reasoned, a meeting of the teachers of these classes should give them every opportunity to learn from one another. With this thought in mind an affair was planned that called for the maximum participation of the membership of the M.I.E.S., and a presentation of their accumulated skills and techniques for common use.

The 1949 October Fair opened with a breakfast in the Fordson High School cafeteria. Then the members and guests proceeded to the shops and halls in the industrial unit of the building, where some eighty exhibits were on display. Sixty of these had been set up by the school personnel of the area, while twenty others were sponsored by commercial exhibitors interested in education. Since the theme of this year's meeting was "Teaching Aids;



The illustration at the left shows a student completing a furnace-control demonstration-panel installation, Fordson High School, Dearborn, Mich. The right illustration shows The Wayne University Industrial Education Guild display

the Key to Successful Teaching," most of the displays featured some device of proved merit that could be used as an aid to instruction. Examples of workmanship, new and unusual projects, and visual aids were also available for inspection. Everywhere there were students and instructors from various schools engaged in activities such as leatherworking, printing, metal spinning, or aluminum welding.

In the radio shop a boy was working on a television set. The course in television is being enthusiastically received by students. Material and methods of presenting this new work were on display. Here, also, were student-built radios representing progressively more complicated sets from the simple one-tube job up through the superheterodyne. Viewing such student work helped each teacher to decide for himself the possibilities and advantages of including like courses in his own particular curriculum.

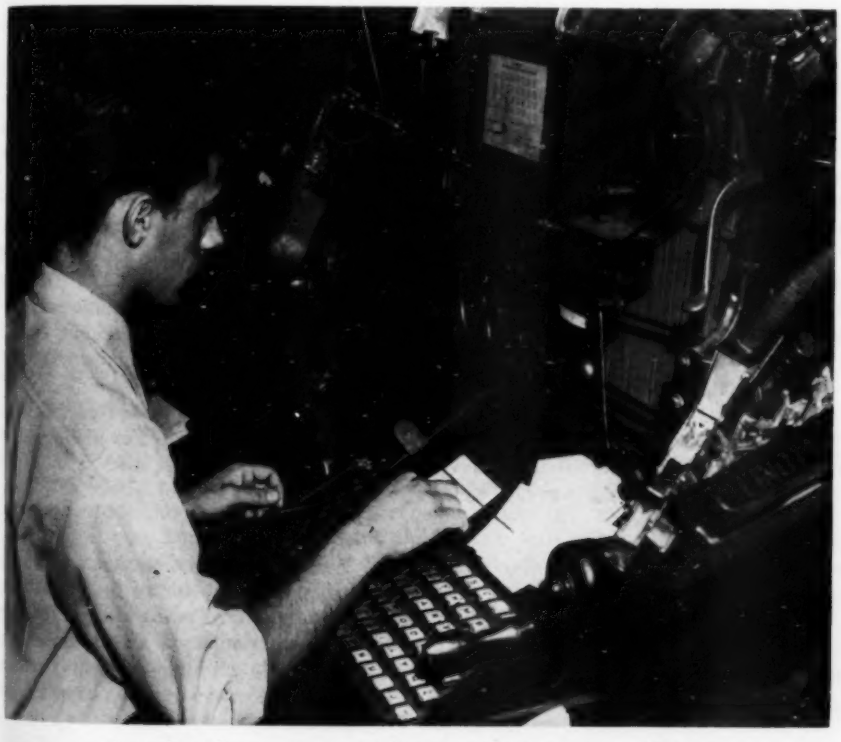
Just outside the radio shop a representative from the Michigan Bell Telephone Company demonstrated the operation of a teletypewriter machine. A large mock-up clearly showed the operating principles of this complicated machine.

In the welding shop, men from the Eutectic Alloys Corporation showed how to use the new low temperature welding rods. A student skillfully demonstrated aluminum welding. In another shop demonstration lectures on metal spinning emphasized that the equipment in most schools was adaptable for this type of work.

The *Air-Age* exhibit was in charge of a postgraduate student who gave instructors trial flights in a Link Trainer. And so it went, through leatherworking and printing demonstrations, multilith and visual aid work, drafting, sheet-metal, art-metal and auto-mechanics exhibits, related science and English job sheets, and aids of every description.

Then an auto starting contest was announced. Sick automobiles were on display in the auto shop, having been afflicted with five man-made troubles. At a given signal, teams of three boys, representing various schools, competed in correcting these troubles and starting the cars. In an elapsed time of four minutes and ten seconds, the boys from Wilbur Wright High School, Detroit, won the first prize, a trophy donated by Hettche Motor Sales. Dearborn High and Washington Trade School teams also received prizes as second and third place winners.

The success of this teachers' institute meeting may be well illustrated by a remark made by one of the instructors to his co-worker. He said "This is the most interesting and worth-while day I have had since I started teaching thirty years ago."



A student demonstrates student use of a Linotype machine. Fordson High School, Dearborn, Mich.

In 1949, 1,564,000 Americans were injured in traffic accidents. — *The Travelers*, Hartford, Conn.

* * *

The 2,338,000 veterans in training under the G.I. Bill and Public Law 16 on May 1, 1950, represent a drop of 8 per cent from the 2,564,000 veterans enrolled under the two laws a year ago.

Earl Bedell, director of vocational education, Detroit public schools, watching a teletypewriter demonstration

A high school student gives an aluminum welding demonstration

Some Leaders in Industrial Education

WILLIAM T. BAWDEN

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(Continued from page 271 of the September, 1950, issue)

William Luther Hunter

If you have been patient enough to read several of these biographical sketches, you doubtless have been impressed, as I have been, by the diversity of interests, the extraordinary variations of personality, the contrasts and the comprehensiveness of the professional contributions, represented in the lives and works of these leaders.

Considering these men and their activities collectively, the magnitude of their combined contributions is inspiring, and the impact of their influence upon the progress of education, more particularly industrial education, is incalculable. At the same time, thinking of these men and their activities comparatively, there seems to be no discernible pattern of similarity of origin, of preparation, of method of self-expression, or of ultimate achievement.

The subject of this sketch was, like the others, an *individual.* Of medium height — probably five feet six or seven inches — he was of stocky, athletic build; the picture of health and vitality. His head was set low on a short, solid neck, on almost massive shoulders, giving the impression of great physical strength. With an open, friendly countenance, and an engaging smile that made its appearance easily, readily, and frequently, he attracted attention in any company.

Our acquaintance began at a meeting of the Manual Arts Conference of the Mississippi Valley, of which I was chairman at the time, and which he attended as a guest, at Purdue University, Lafayette, Ind., in November, 1924. From that time we met at conventions at least once or twice each year, and I visited him at Iowa State College on two occasions. But I am getting ahead of my story.

Early Life

William Luther Hunter was born March 21, 1896, at Dike, Iowa, and died at his home in Ames, Iowa, May 23, 1939, at the age of 43 years.

He was a graduate of Iowa State Teachers College, Cedar Falls, with the B.A. degree, major in industrial arts, in June, 1916. After graduation he taught industrial arts one year, and at the outbreak of World War I he enlisted in the Aviation Division of the U. S. Navy. He had previously had considerable practical experience in carpentry and other work in the building trades, and soon after he enlisted he was given an assignment as carpenter's mate.

He saw two years of service overseas, and visited England, Ireland, Scotland, Wales, France, and Belgium. For distinguished service he received the coveted citation from the Secretary of the Navy.

At Iowa State College

Following the close of World War I, he went to the State University of Iowa, Iowa City, as instructor of industrial arts, where he remained from 1919 to 1925. During this period also he was pursuing his own graduate studies on a part-time basis. The next year, 1925–26, was spent in graduate study at Teachers College, Columbia University, New York, where he completed the requirements for the M.S. degree in June, 1926.

From September, 1926, to August, 1928, he was editorial assistant on the staff of the *Industrial Education Magazine,*

Peoria, Ill., and did some part-time teaching at Bradley Polytechnic Institute, now Bradley University.

In September, 1928, he was appointed assistant professor of industrial arts at Iowa State College, Ames, and, upon the retirement of Adolph Shane, in 1931, he was promoted to the position of head of the department. He held this position until the time of his death, and it was here that he made his major contribution.

William L. Hunter

He was granted leave of absence and completed one year of graduate work at Harvard University. Later, in summer sessions, he was enrolled in the Graduate School at Pennsylvania State College, and at the time of his death he had nearly completed the requirements for the Ph.D. degree.

Interest in Research

Shortly after he became head of the department of industrial arts at Iowa State College, Professor Hunter began the development of a program of graduate work leading to the M.S. degree. The vigorous and skillful leadership he gave to this work began almost immediately to show results. Especial effort went into the planning for the summer sessions, one feature of which was the bringing in of lecturers and discussion leaders from off the campus.

I remember very well being invited by Professor Hunter to spend two days in his department during the summer session of 1932, the first summer after he became head of the department. On the afternoon of the first day, July 5, he asked me to take charge of a two-hour seminar on "Some Problems of the Teacher of Shopwork and Drafting." In preparation for this session he requested the graduate students in residence to submit lists of problems or questions which they wished to have discussed. Approximately 100 such problems were submitted by 37 graduate students enrolled. These were classified under six or seven appropriate headings, making a typewritten list of about three pages. Hunter then had copies mimeographed for distribution to the audience at the beginning of the seminar.

I have recalled that afternoon session many times, as a stirring, stimulating experience. There was ample evidence that Hunter was inspiring his students to an earnest search for self-improvement, and to ways and means for achieving higher standards in industrial-arts teaching.

On the second day I was invited to lead a similar discussion of "Some Problems of Supervision in Industrial Arts." And following a luncheon attended by members of the faculty, I was invited to discuss "Some Problems of the Teacher-training Institution."

For the summer session of 1933, Hunter took a more significant step forward when he invited the late Charles A. Bennett, then senior editor of *Industrial Education Magazine*, to spend three weeks on the campus, and conduct a graduate course in "Historical Research in Industrial Education," with an enrollment of about 40 students.

An Indefatigable Worker

William L. Hunter was an indefatigable worker, and developed to a high degree the ability to inspire in his associates and in the students enrolled in his department the same disposition to industry. One way in which this activity bore fruit was in an extensive program of educational research, and the turning out of a prodigious quantity of bulletins and reports of research studies, very generously made available to all who were interested.

Whenever Hunter and his work come to my mind, I think of an almost continuous stream of bulletins and reports, most of them mimeographed. I believe most of those who knew Hunter during the eight years he was head of the department of Iowa State College will agree that one of the distinctive features of his work, which they will always remember, was this extensive series of reports of research studies.

How he found the time for the immense amount of research and writing for which he himself was responsible will never be known, to say nothing of the studies which he supervised, directed, and frequently collaborated in. In addition, there was an endless amount of editorial work on the reports, and the supervision of production.

Bulletins and Reports

To give some idea of the nature and scope of the educational research to which Hunter devoted so much time and effort, it is appropriate to refer briefly to a few sample reports.

At the 23rd annual meeting of the Manual Arts Conference, held at Chicago Teachers College, December 1–3, 1932, Professor Hunter led a discussion of "Research Problems in the Manual Arts," in connection with which he distributed copies of a mimeographed list of titles of 159 master's theses in industrial-arts, as reported by eleven member institutions. The discussion aroused so much interest that he was requested to continue the study and report at the next meeting.

At the 24th meeting, held in Chicago in December, 1933, Professor Hunter distributed copies of a 180-page bound volume entitled, *Annotated List of 800 Graduate Theses and Dissertations in Industrial-Arts Education Accepted by Institutions of Higher Learning in the United States, 1892–1933*. Only those who have attempted a similar compilation have any conception of the enormous amount of labor contributed to this project by Professor Hunter and the graduate students in his department during that strenuous year. And only those who are responsible for graduate studies in industrial education understand the value of the contribution thus made.

Tests in Industrial Arts

Another example is a 100-page bound volume of *Test Questions in Industrial-Arts Education*, completed and distributed in August, 1932. Almost from the very beginning of his work as a

teacher, Hunter took a keen interest in the testing movement. Included in this volume are 17 tests of various types: multiple-choice, completion, matching, and others. Some of these were original with Hunter, some were worked over and modified by him with the aid of classes of graduate students, and some were credited to other sources.

About a year later there appeared a 75-page bound digest of *Objectives of Industrial-Arts Education,* in the compilation of which John J. Voth collaborated. The method employed was to examine in detail the professional literature of the subject, published from 1920 to 1933, and to quote in full, or abstract, all statements of "objectives" that were encountered. The book includes statements, classified under 18 subheadings, from 138 authors and leaders in the field of industrial arts, referred to by name of author, with book, chapter, and page cited. The quotations range in length from five or six lines to 50 or more. This compilation should serve as an invaluable source of data for comparative studies as the years pass.

In August, 1934, there came another 75-page bound volume, entitled, *A Guide to Magazine Articles on Industrial Arts and Vocational Industrial Education,* in the preparation of which Everett G. Livingston collaborated with Hunter. The authors undertook to list all important articles in these fields which appeared in the professional journals between January 1, 1920, and January 1, 1934. Articles are listed by title, author, magazine, volume, and page reference. The number of titles is 1550, classified under 65 subheadings, and the number of authors cited is 865.

(To be continued)

Patternmaking and Foundry Work in the General Shop

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Patternmaking and foundry, as a course, is a phase of the industrial-arts program which deals with the construction of models, forms and replicas of wood, metal or plastics. These forms will later be used in a sand mold and result in a metal casting. They are generally classified with the metalworking trades because the casting is the result of the pattern. Patternmaking is not well understood by the average individual. It requires the use of many specialized processes, tools, and items of related knowledge.

Patterns are essential in most phases of machinery and engineering. The castings of most machines require the making of patterns before the machines can be fabricated. Since a casting must be made to a specific dimension and a definite shape, the pattern must likewise be constructed to a specific size and shape. Special allowances must be made for draft, finish, and metal shrinkage.

Castings vary in size and weight. There are many which weigh but a few ounces while others have a weight of several tons. Different metals are used in making castings. Practically every metal has a different shrinkage allowance which must be taken into account, in pattern construction. Then, too, the type of casting and the frequency of use of the pattern will determine the type of material that must be used in the construction of the pattern.

Patternmaking and foundry work dates back hundreds of years. The first known material in pattern construction was beeswax. Wax was used because no metal tools were available with which to form the patterns out of wood. Wax was plastic and easily worked with the hands and the crude stone instruments which were in use at that time. Later as metal became a medium for tool construction, wood found its place as a material for pattern work. Wood proved to be a better material for pattern construction because it made a more substantial form than wax. Clay, which also was used, was not sufficiently strong to withstand the continual ramming necessary for a pattern. Wood also was chosen because it was easy to work. It had a comparatively low cost, and will retain its shape for many molding operations if properly prepared and handled. Metal later became a material for pattern construction. It was found to be more substantial than wood although its cost was greater. Hence metal is now being used very extensively for molding where many castings are required from the same pattern.

Patternmaking and foundry work may be a good vocational possibility for a prospective tradesman. Because of its specialized nature, there is usually a minimum of labor disturbance within its scope. The result assures the worker better working conditions. The work may be very interesting to the apprentice and the journeyman. It is a clean job, commands a top rate of pay, and has a future which may never be obliterated. One may choose to work in either patternmaking or foundry and find the work equally interesting and satisfying. The size and type of patterns and castings usually vary so much that there is little chance for the work of the patternmaker to become monotonous. Many phases of this type of work may also become an avocation for those so inclined. The patternmaker is usually a good all-round shopman. He must have great skill and a broad understanding in the use of woodworking tools and machines. His knowledge of machine shop should be of a high caliber. He should be well acquainted with foundry terms and techniques. He must be able to make and read working drawings. Lastly, he must have a well-developed knowledge of related items to patternmaking and foundry as well as the ability to construct a pattern to specifications and usability.

It seems to be the mistaken opinion of many instructors, especially in the smaller schools, that patternmaking and foundry cannot be set up in their respective programs. They apparently think in terms of a large pattern shop and a large foundry cupola. The shop area need not be equipped with these special items of equipment to teach the fundamentals of patternmaking and foundry. The woodworking area may

serve as the pattern shop. The common gas furnace, which most shops have in the sheet-metal area, will supply sufficient heat to melt low-temperature metals. Improvised tools simulating pattern and foundry tools can be constructed by the instructor at a minimum cost. Perhaps the only special tool which is needed is the shrinkage rule. This may even be eliminated and the common rule used. Shrinkage should be clearly discussed in either case. Such metals as lead, babbitt, and zinc can be melted in the gas furnace or even with a common blowtorch. Rammers, sprues, riddles, etc., can be made in the shop. In many cases a foundry can be found close at hand which will be very willing to supply the shop with a small quantity of molding sand and parting material. The aggressive shop teacher can construct a furnace from an old oil drum lined with firebrick and clay. A large crating box will serve as a sand bin if nothing better is available. You need not neglect this vital phase of the industrial-arts program because standard pattern shop and foundry equipment is not available.

The following presents a suggestive program which can be used in a small school shop at a very low cost, and at the same time teach the fundamentals of pattern making and foundry. It is the purpose of this outline to teach in a rudimentary form, the fundamentals of patternmaking and foundry as an integral part of the industrial-arts program.

Patternmaking and foundry has several objectives which it attempts to achieve. These objectives are as follows:

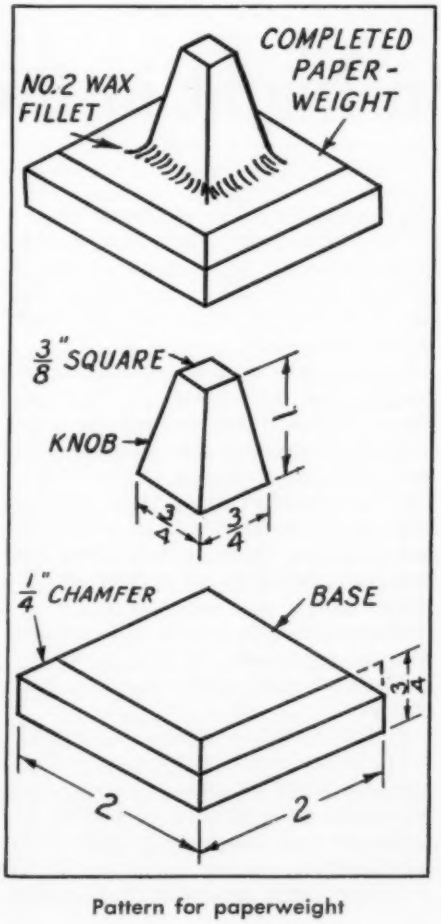
1. Assist the student in learning the fundamentals of patternmaking and foundry.
2. Aid in the organization and execution of a definite plan of procedure.
3. Aid in planning a job to its entire completion.
4. Assist a student to develop proper and safe work habits.
5. Aid in the development of accuracy.
6. Promote the development of skills and items of knowledge which may serve as a foundation for either a vocation or a hobby.
7. Emphasize the direct relationship to the other shops and curricula of the school.
8. Aid the student in mastering the use of specialized tools.
9. Aid the individual to develop an appreciation for good workmanship and artistic design in a project.
10. Stimulate the meaning and value of dependability.

Safety in the shop is as important as the work itself and is a prerequisite to a good and efficient shop program in the pattern shop and foundry. Several precautions which should be followed as a personal protection are listed below.

1. Know and use *Safety First* when necessary.
2. A burn is the most common type of injury in a foundry; treat it immediately.
3. Protect yourself with asbestos guards and goggles when handling molten metals.
4. Avoid touching pieces of metal on the floor — they may be dangerously hot.
5. Do not interfere with fellow students while working in the shop.
6. Wear goggles when grinding or chipping metals.
7. If you do not work in a specific unit, do not enter the area while others are working there.
8. Do not stand in your own light while working.
9. Always be alert for things which may cause an accident in the shop.
10. Avoid all tussling and rowdiness.

Making a Pattern and Casting

One may more fully and accurately understand the principles of patternmaking and foundry if a project of minimum difficulty be selected as the first job. This project is a simple paperweight. The instruction sheets are made for the use of the student, and should serve as a guide in the making of the first pattern. Lead and babbitt are metals easily obtained which have a low melting point. They, therefore, are selected as the metal for the first casting. The $\frac{3}{8}$-in. shrinkage rule is selected as the proper scale to use because the shrinkage of lead and babbitt is $\frac{3}{8}$ in. per foot.



Pattern for paperweight

You may now proceed with the construction of the pattern according to the specifications found on the following pages. It is essential that you follow the instructions given you to the finest detail. In patternmaking the prime consideration is accuracy. You must learn to be accurate with all of your measurements, layout, and construction.

CONSTRUCTING A SIMPLE PATTERN FOR A PAPERWEIGHT

General Information:

Before a casting can be made in metal, a pattern must be made of wood and constructed to the exact size and shape of the finished casting plus an allowance for metal shrinkage. All metal will expand when heated to a liquid state and return to its original size when cooled. Compensation for this shrinkage is made by using a *shrinkage* rule. An example of this is cast iron which shrinks $\frac{1}{8}$ in. per foot. We therefore must use a scale with the $\frac{1}{8}$-in. shrinkage allowance calibrated on it. Actually the scale is $\frac{1}{8}$ in. longer than the common foot rule.

When a pattern is completed it is coated with two applications of black shellac — clear shellac colored with lampblack. This is the standard coloring for unfinished castings. Surfaces which are to be finished (machined) are coated with red shellac — clear shellac colored with Venetian red. Yellow shellac is used for core prints and clear shellac is used on parting surfaces. All inside corners, unless specified, are filled with wax, leather, or wood "fillets." Fillets aid in producing a good casting by rendering a pattern easier to draw from the mold and to minimize wash of sand. Specifications will determine the size and type of fillets to use.

Specifications:

The suggested project requirement is a paperweight. The base is $\frac{3}{4}$ by 2 by 2 in. with a $\frac{1}{4}$-in. chamfer around the top. The block which forms the knob is $\frac{3}{4}$ in. square at the base, $\frac{3}{8}$ in. square at the top, and it is 1 in. high. A wax fillet (No. 2 size) is placed at the base of the knob where it joins the pattern base.

Steps in the Construction:

1. The pattern is made of soft wood, usually sugar pine.
2. The base is worked square with a plane and rasp to the specified dimensions.
3. The knob is cut out and worked to the specified size and shape.
4. The chamfer is cut on the base. Use the shrink rule.
5. The center of the base is located by drawing diagonal lines across the corners.
6. A 1½-in. brad is started into the top of the knob and the knob is fastened in place with glue.
7. Remember that all vertical surfaces should have a slight slope called *draft*. This draft is usually two or three degrees.
8. Draft makes drawing of the pattern from the mold an easier operation.
9. All mill marks must be sanded from the pattern because these will hinder the drawing.
10. Apply a coat of black shellac. When it is dry sandpaper the pattern to a smooth finish.
11. Place a No. 3 wax fillet around the base of the knob with a fillet iron.
12. Make all necessary waxing repairs. Sand to a smooth finish.
13. Apply a second coat of black shellac. When it is dry repeat the sanding operation.
14. Apply a third coat of black shellac as before. This coat need not be sanded unless the surface of the pattern is rough.
15. The pattern is now ready to ram in the mold.
16. Patterns are usually accurate to 1/32 in. on all dimensions. In many cases the accuracy must be held to 1/64 in.

Questions for Study

1. What is a pattern?
2. What is a split pattern? Why is it sometimes used?
3. Why is sugar pine most commonly used for pattern work?
4. What other types of lumber are used?
5. What is metal shrinkage?
6. What is a shrinkage rule?
7. Compare a shrinkage rule with a standard rule.
8. What is draft?
9. Why is draft necessary on a pattern?
10. What are fillets?
11. Why are fillets used on a pattern?
12. List the several types of fillets.
13. Why must all surfaces be smooth on a pattern?
14. Why must a pattern be constructed to exact dimensions?
15. What is pattern shellac?
16. List the color combinations of pattern shellac.
17. How are shellacs colored?
18. Explain the meaning of shellac colors.

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Father and Son Night in the Shop

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In past generations many boys grew up to follow in the footsteps of their fathers. In most cases they learned a trade or business directly from the father or under his supervision. They were especially close to their fathers during the very important adolescent period. Today there is likely to be a wide separation, not through choice, but because of our present economic structure. The father has his work to perform to earn a living and the son receives his education through a public school system in such a manner that there is a limited opportunity for father-son companionship during this important constructive and educational period.

The Plan

The following suggestions pertain to a plan that is aimed to bring back some of that father-directed learning. Much of the glamour of the *good old days* may not have been desirable but no one will dispute the value of the father-son association.

The following plan should be as feasible in the large city as in the rural town. It will take some thinking and planning, but the results forthcoming will be well worth the efforts expended.

Several weeks after the school year has started, offer the students in your shop classes an opportunity to work one night a week (or month). Ask them to invite their dads to accompany them. Perhaps the students as a group might write a letter to each dad explaining the work night and extending the invitation. There are numerous possibilities for carrying out this step.

There are several reasons for suggesting that the organization meeting be delayed until six or eight weeks of school have passed.

1. The boy will have had an opportunity to familiarize himself with the shop so that when his father joins him he, the son, will have the feeling that he is showing his father how to do things (and in many cases he will be).
2. It will give the instructor an opportunity to make his plans. Perhaps he will use the gatherings as a reward for the boys — allowing only those boys who have expended a certain amount of effort and interest to bring their fathers. It should not be merely a matter of quality, or achievement. Even the most retarded boy should be allowed the *honor* of having his father by his side at the club meetings if he has shown the desire and effort.
3. It will give the teacher an opportunity to contact some of the fathers that he may feel would be especially desirable to have present; that is, the fathers of boys who have shown special aptitude, the fathers whose sons may be retarded in class, or a father who may have some special trade about which he can talk to the boys.

How to Conduct the Club

The "Father and Son Club" can be handled in any number of ways:

1. The boys may do the work and the fathers simply observe. Probably this would be the best method for the first night.
2. The father and son can work on the same project.

3. The father and son can work on different projects.

4. Simple lectures (talks) on home craftsmanship may be presented by the instructor, coupled with good demonstrations, visual aids, and emphasis on safety. The possibilities are unlimited.

5. Talks or demonstrations may be given by the fathers.

6. Talks or demonstrations may be given by advanced students.

The Benefits and Who Will Derive Them

What will these meetings accomplish?

1. They will bring the fathers and sons together for a short period and, it is hoped, will create one or more new binding interests between them.

2. They will give the boy something to look forward to and will provide the fathers with an opportunity to share in their son's interests.

3. The factor of guidance along vocational and educational lines may be given a boost during these periods, or information gathered can be passed along to the school guidance counselor.

4. Interests may be aroused in the fathers to provide home workshops for the boys.

5. A sufficient desire may be aroused to provide special classes for adults.

6. If the shop has machine equipment, the dads may be shown the hazards and add their precautions to those of the instructor for safe operation by the boys. The fathers will receive a more sympathetic attitude toward penalties placed on the boys who do not observe shop regulations.

Who will derive the benefits?

1. *The boys* will have a chance to be with their fathers more hours of the week. They will tend to have a greater incentive for achievement. Skills will be further developed because of additional use of the shop and tools.

2. *The fathers* will have a chance to see their sons at work and perhaps a chance to try their own hand at a few jobs.

3. *The teacher* will have an opportunity to meet the fathers of his pupils, the men of his community. He will have an additional motivating factor in the conduct of his classes.

4. *The shop* may even benefit. With mild success the enthusiasm of the club may arouse sufficient interest in the town (school board) to procure additional funds for a better shop and/or better equipment.

5. *The community* will be benefited through keener interest in education promoted in the present adults, and at the same time the creation of better future citizens in the boys.

Just how much extracurricular work a teacher should take upon himself is always an important question. This is usually answered by the teacher himself, limited of course, by definite requirements of the particular school system in which he teaches. However, the suggestion which is offered here should pay the shop instructor many dividends in good will and good fellowship, a closer association with the fathers of his students and in turn a greater knowledge of his student's environment.

Contests as a Part of Functional English

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The country is contest crazy. Nearly every radio program wants to give something away. Newspapers and magazines have announcements of contests offering prizes from automobiles to roller skates. In groups and gatherings conversation turns to the latest contest. People stay home just in case the phone may ring and the cheery voice of an announcer will ask something like: "What color is mentioned in the title of the song 'Blue Skies'?" for which the person will receive a trip around the world for the right answer and only a Mediterranean cruise for the wrong answer.

Soap companies, soup companies, and even dog food companies are in the act offering prizes for jingles, essays, limericks, slogans, biographies, and puzzles such as "Why I Married My Wife." National brand companies, local companies are all in the swim to give away money and merchandise to advertise their products and cut down their taxes. This contest madness has entered into our American way of life. If it is such a part of our life then why not introduce it in the classroom?

As a teacher of English in a practical arts and general education program I have found it difficult to arouse the interest of this group in poetry. Yet, by the use of contests that require jingles or limericks I have been able to arouse a great deal of interest. Don't misunderstand me. I do not mean that limericks and jingles are poetry in the academic sense but through them the students arrive at a better understanding of rhyme, meter, and cadence required in poetry. As a simple illustration let us take the contest idea of a certain baking company. The competitors were required to submit the fourth line of a jingle of which the company furnished the first three. These lines were written on the board. In the jingle the first and third line rhymed. I pointed out the last line must rhyme with the second. The class then wrote down all the words they could think of, after which we placed them on the board. When they had exhausted their fund of words I introduced three copies of a rhyming dictionary. They were instructed in the use of this type of dictionary. Only one student had ever heard or seen this kind of dictionary before. The class was amazed at the additional words they found, and were further amazed that the school library had two copies of the book. With our board filled with rhyming words I pointed out that although all our words rhymed still there were many that were unsuited. I did not go deeply into accentuation but simply pointed out that such a combination as (city — pity) was a much better choice than, for instance (pity — charity). The next step was indicating the metric foot and verse, showing how each line agreed in the same number of syllables. I did not go into this too deeply, and did not use such terms as "iambic pentameter" and "anapestic trimeter." There was no need for it. Like a child learning to catch a ball; first you cup his hands and drop the ball in, you don't start him with a Mickey Cochran catcher's mitt. The class was learning the fundamentals of poetry, learning it in a functional way. They were going to make use of their new knowledge and send in the best line — their own best line.

Sending in the entries became important too. They were submitted in formal letter form. Before the envelope could be sealed everything had to be perfect. Heading, salutation, closing, all had to be correct.

We had an excellent opportunity for oral work last fall. A local radio sports an-

(Continued on page 334)

Industrial Arts and Vocational Education

John J. Metz, Editor

LIFE ADJUSTMENT EDUCATION

The Commission on Life Adjustment Education for Youth, appointed in 1947, defines "Life Adjustment Education as that which better equips all American youth to live democratically with satisfaction to themselves and profit to society as home members, workers, and citizens."

C. M. Miller, director, State Board for Vocational Education, Topeka, Kans., is quoted as saying "Education for life adjustment means much more than vocational education. It means much more than *any* particular area in education. It means finding in school life the things that happen to boys and girls in classrooms that help them solve whatever problems they have. The whole education for the life adjustment movement is an honest attempt on the part of school people to improve the program of education in all its areas for the benefit of the youth of America.

"It does not seem to make so much difference what you teach as *how* you teach it and *what* it does for the boys and girls you are teaching. . . .

"If one is occupationally happy, a lot of other things work out and get adjusted. Maybe . . . vocational subjects lend themselves a little more readily to being taught along with life situations than do some of the other subjects. The attitude of academic teachers often is 'We don't know — we haven't tried it.'"

Do not all of these statements come very close to the objectives held by good industrial-arts teachers? Probably all that is necessary for your course to fit into the framework of life adjustment education is re-emphasizing certain things that you have already embodied in your course, or a new twist may be given to what you are offering by a few additional items that may be found necessary after you have made a new analysis of your course.

Industrial-arts teachers will do well to check up on their offerings. It will be amply worth their while, help their students, and redound to the honor of their school.

THE EYESIGHT OF YOUR STUDENTS

The National Society for the Prevention of Blindness is authority for the statistical statements which follow. These statements contain important information for the shop teacher who is striving to do his very best for his students.

According to the information gathered by the society, 4,500,000 American youngsters are suffering from some kind of eye defects. That means one of every four American school children need eye care that they may or may not be receiving.

According to this, about seven or eight of the students in a shop class of thirty ought to be receiving eye care of some type or other. Probably the student himself is but vaguely aware that something is wrong with his eyes, and his parents may know nothing about his troubles either.

Teachers who are on the alert for any signs of impaired health in their students can, therefore, do a valuable bit of service by detecting eye troubles early enough so that the services of an ophthalmologist may be secured at a time when it can still do some good.

It is discouraging to learn that the blind population of the United States is increasing at the rate of about 4800 a year. This is especially deplorable in face of the fact that twenty years have been added to the average life span in America since 1900. Some of these blind people will be blind for a long while. Teachers should be very strict in carrying out the order to wear goggles for doing grinding and other dangerous shop activities. Foster a Wise Owl Club in your classes. Anyone can become a member by proving that his goggles saved his sight. That happens in shop classes from time to time. Be good to your students by being adamant in enforcing regulations which aim to preserve their sight, and insist that the boy who has a sight defect do something to cure or at least alleviate the trouble.

The society claims that sixty Americans go blind each day, and that fifty per cent of this blindness could be prevented if medical treatment were started in time.

The National Society for the Prevention of Blindness is conducting a nationwide campaign during the month of September to focus attention on the importance of protecting sight. Help them achieve this objective.

LET US CONSIDER THE MATTER OF SAFETY

Now that the school year 1950–51 has started, it may be well to overhaul the safety lessons which were used last year and see what can be done to bring them up to date and make them more effective.

Statistics show, for instance, that there were fewer automobile accident deaths on streets and highways of America last year than in 1948. There were more injuries caused however.

In 1949 there were 31,800 fatalities, while there were 32,200 in 1948. There were 1,564,000 injuries in 1949, while the reports show that there were but 1,471,000 injuries in 1948. The smaller figure is staggering enough, but last year's total is actually terrifying. That one item should cause us to think about our duty in this matter.

"But," you might say, "I am not teaching the auto-mechanics classes in our school." Probably you are not. Could you be influential in having your school inaugurate a real, worth-while, safe-driving course? Even if that were impossible, couldn't you help the cause by preaching the safe driving gospel continuously.

But the automobile is not the only cause of deaths and injuries. It is an unfortunate fact that an American worker is killed or severely injured every three minutes. That bit of information should make every shop teacher think. It is an unforgivable oversight if safety is not made an important part of every shop course. It is true, some instructors have emphasized this important subject for years in their shop instruction, but too many give it little if any special emphasis.

The beginning of the school year is the time to inaugurate a well-developed safety course, if you have not done so in the past. Do your part in making the American worker the safest worker in the world.

Problems and Projects

A UNIT IN METAL TOOLING — COVERING A WASTEBASKET OR A BEDROOM BASKET

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The tooling of thin sheet metals, in this case 36-gauge copper, is one of the most effective methods of decoration. With these tooling metals we can cover wooden boxes, wooden book ends, make wall plaques, desk blotter corners, cover wooden stands to make hot dish plates, and the like.

Wastebaskets

This project is a straight-sided wastebasket. Wastebaskets with straight sides, and an elliptical top come in practically the same dimension no matter where they are obtained. The height is about 12½ in., and the distance around the top under the wired edge runs from 27½ to 28 in. Copper for this work is obtained in 14-in. widths. The bedroom basket has a height of 10¾ in., and a distance around of approximately 24½ in. Hence, a piece of metal 12 in. wide will do very well.

A wastebasket of this kind is sold for $10.50 without a monogram, and for $12.50 with a monogram, and we can make it for $1.50 or less.

Method of Procedure

1. Procure a straight sided, elliptical shaped wastebasket. These may be procured for fifty cents or less. When the basket has straight sides it eliminates the necessity for development.

2. Measure distance around the basket just under the top wired edge. In this case it is 27¾ in.

3. Add an additional 1½ in. of material if a ½-in. lock seam is desired. 27¾ plus ¾ equals 28½ in. Therefore, cut a piece of 36-gauge copper, 14 by 29 in.

4. Square the left-hand edge so that there is an edge to work from.

5. Lay off ¼ in. at one end. This is for one side of the lock seam. Then lay off 27¾ in. This is the distance around the basket. Then mark off ¼ in., and another ¼ in., and trim the remainder.

6. Lay off lines in the 27¾-in. section which are 9⅞ in. from the top, 10⅛, 12⅛, and 12⅞ in., all measured from the top. Then trim off all excess.

7. In the center of the 27¾ in. set on your initials or monogram. Locate monogram or the individual initials. Trace the design with a pencil, or meat skewer, or leather modeling tool. Now, reverse metal and work up design, from the back to the front and set down around the letters. Continue this until desired results have been obtained.

8. Raise the two ¼-in. bands that have been laid out from the series of measurements from on the top edge of metal.

9. Hammer a 2-in. section inside these two bands.

10. Turn up at right angles to the face of the metal the ¼-in. hem that is on one end and the ½-in. hem that is on the other end.

11. Wrap metal around basket and these two turned-up edges will butt.

12. One hem is twice the other, so turn the excess on the large hem down tightly over the other, and now turn them all down flat on the back of the basket. In this manner lock seam has been made and the metal is held tightly around the basket.

13. Turn basket upside down and force metal down under wired edge. We may need to open up this edge in one or two places.

14. While basket is in this position turn remainder of metal in under the bottom, being sure not to pull the metal down from under the wire edge.

15. Rub all over with fine steel wool, or steel wool and pumice.

16. Wipe to be sure no particles of steel wool remain, and if pumice has been used it may be necessary to wash and dry.

17. If oxidation is desired, mix a small amount of liver of sulphur (potassium sulphate) in warm water and apply with a brush, a cloth, or a piece of steel wool.

18. Permit to dry. Then with fine steel wool rub down until the desired finish has been obtained.

19. Lacquer.

20. Always mark the back of the metal with name or initials in an inconspicuous place to show by whom this has been done and to show it has been handmade.

This project, useful and purposeful, contains the processes of cutting, measuring, tooling of design, forming by hand, the lock seam, steel wooling, oxidizing, finishing, and lacquering.

The bedroom basket, if chosen, would be carried on in the same manner, although less copper would be necessary to complete it — therefore, less expense.

ALL-METAL TRIPOD

M. C. ANDERSON
Globe, Ariz.

The tripod described in this article involves several metalworking operations.

The legs are of telescoping steel tubing and are released or locked by a quarter turn of the lower section. They lock rigidly in any position from fully closed to fully extended. The dimensions may be changed of course to suit your needs. The operations required include metal turning, which must be held to reasonably close tolerances, sawing, filing, knurling, drilling, and tapping.

Fig. 1. The leg locking mechanism is simple but requires a precision fit

The head is turned from aluminum and presents no particular problem. If facilities for casting aluminum are available, the head may be made up as a single casting. The head illustrated was turned and cut from the solid. Material for turning this head may be obtained by melting down aluminum scrap and pouring into a tin-can mold.

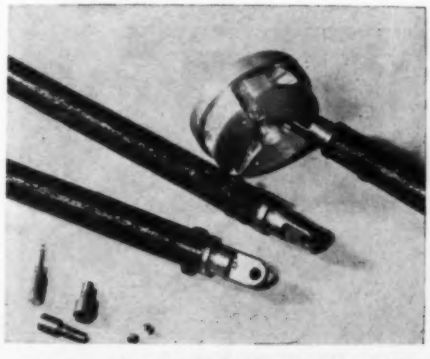

Fig. 3. The head, leg attachments, and attaching screw

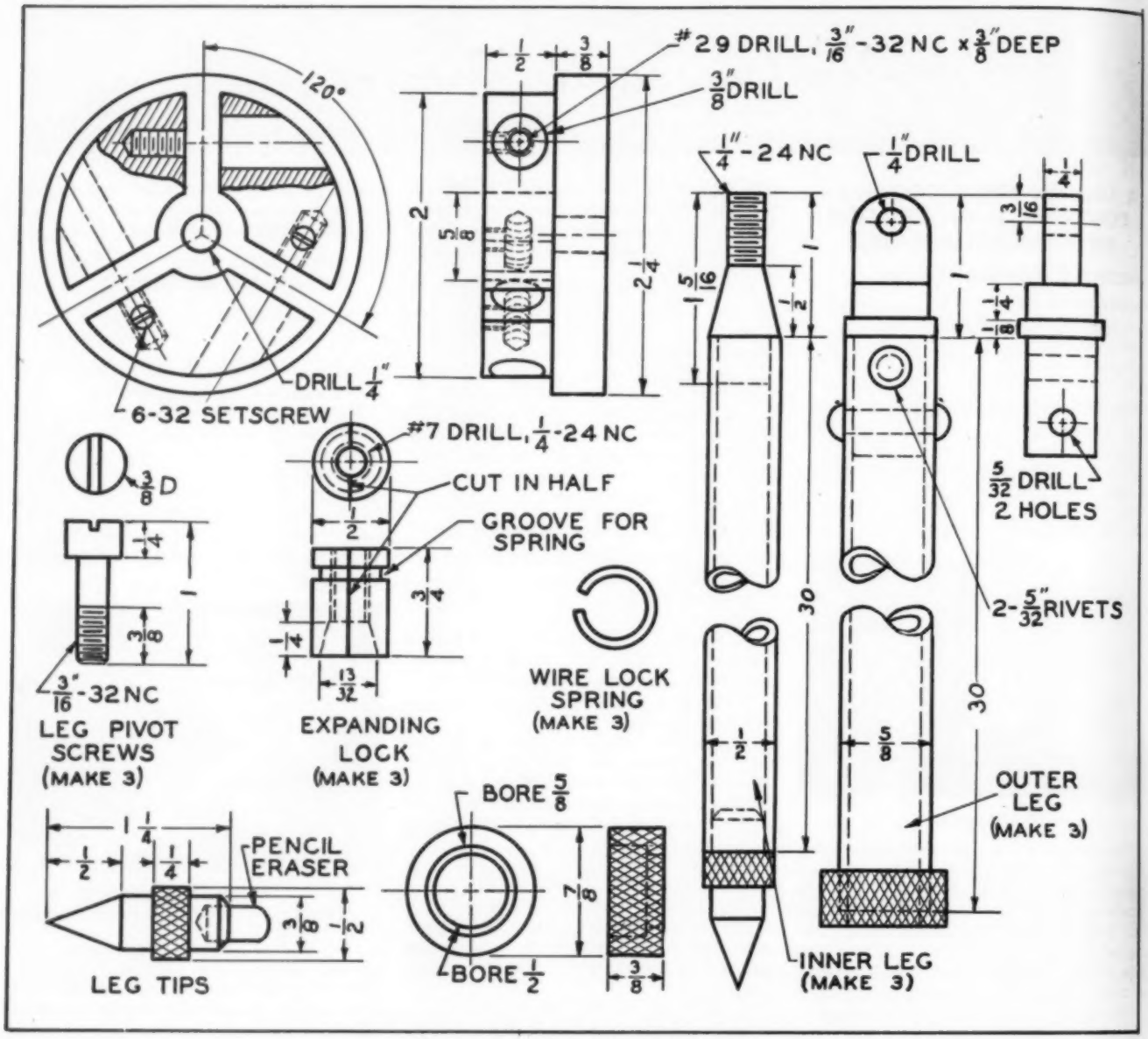

Fig. 2. Details of all-metal tripod

Chuck the piece in the lathe and turn it to the dimensions shown in Figure 2. Bore out the depression for the lock screw in the bottom and cut the head free with the parting tool. Drill holes radially into the bottom of the leg attachment slots so the metal can be removed by sawing. Use heavy paper or cardboard to prevent marring the work when it is placed in the vise. True up the slots with a file and drill the leg attachment holes and the center hole for the camera locking screw. Note that the leg attachment holes are tapped on one side only. The screws are made with a wide shoulder that tightens against the leg and is locked by a setscrew, giving a rigid assembly free from wobble. Coarse threads should be tapped where possible as they wear better than fine threads in the soft metal. The setscrews are headless and are made by sawing sections off a 6–32 screw and slotting one end with a hack saw.

Fig. 4. Tips of the legs are reversible to provide metal tips for out of doors, rubber tips indoors

The legs are made from two telescoping sections of steel tubing. The locking mechanism is quite simple, as shown in Figures 1

Fig. 5. Tripod head showing the leg attaching screws and setscrews which lock them. The head is completely lathe turned, except for the leg slots which are hacksawed to a drilled hole

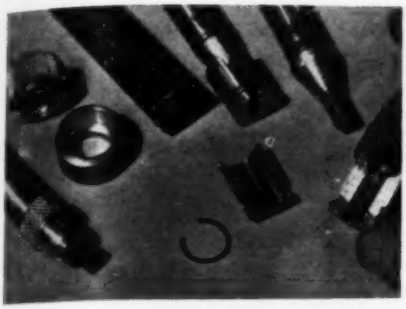

Fig. 6. The parts which lock the tripod legs at any extended position. Shown are the cone, split expander sleeve, wire retaining ring, and the aluminum rings which trim the outer legs

and 6. The original was turned from aluminum, but iron or brass bar stock would serve as well. A small cone is turned and threaded to fit the inner leg, and should fit tightly enough to turn with the leg. The expansion sleeve should be turned and threaded complete before splitting with the hack saw. The retaining ring is of spring wire and may be cut from a spring or it may be made by forming it around a rod. It should fit loosely for best results. The lock assembly should slide freely inside the larger leg and lock tight with a quarter turn of the inner leg. To operate properly, the split cone must fit closely inside the tube, without excessive clearance, and must turn freely on the threads. Lubricate the threads, but do not lubricate the outside of the sleeve as it locks by friction with the outer wall.

Fig. 7. Split the locking sleeve by hand sawing

The legs are finished off by a knurled aluminum ring at the bottom of the upper section, which serves as a stop when the legs are extended. Reversible tips of aluminum, shown in Figure 4, permit rubber feet to be used indoors and metal points out of doors. The rubber tips are pencil erasers, set in a drilled hole, and are replaceable.

Finish the tripod, except for the trim, with two coats of black crackle varnish, available at radio supply houses. For best results, this paint should be heat-dried as explained in the directions on the can.

In 1949, 9350 pedestrians were killed in the United States. — *The Travelers*, Hartford, Conn.

FIREPLACE ASH TRAY

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Assistant Professor of Industrial Education
and
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New Britain, Conn.

Concrete work can be taught effectively in the industrial-arts program of today. The general shop and especially home mechanics are ideal areas in which concrete can play an important part. With so much building of today and such great quantities of concrete construction, the industrial-arts people should not overlook this medium in their shop program.

Concrete may be used to make many projects that will interest the students. Boat anchors, ash trays, wheel chocks, hot-dish mats, flower bulb bowls, door stops, miniatures, urns, soldering copper holders, weights, driveway markers, are only a few of the useful objects that may be made. An attractive feature in using this material is that it involves little equipment, and very little expense.

From the standpoint of learning, a project such as the miniature fireplace ash tray, shown in Figure 1, involves creative ability in the design, skill in cutting, bending, soldering, smoothing, and finishing wood, mixing mortar, and setting stones.

Such an ash tray fits well into a clubroom, recreation room, or den. The experiences gained in making it are a motivating experience for a student in the fields of industrial arts and general education.

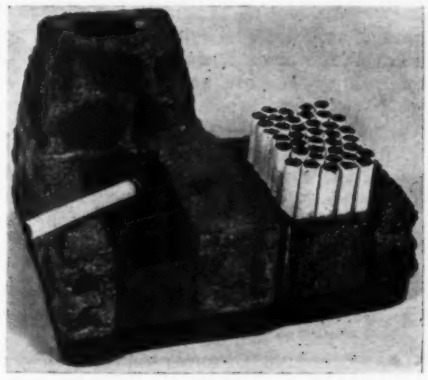
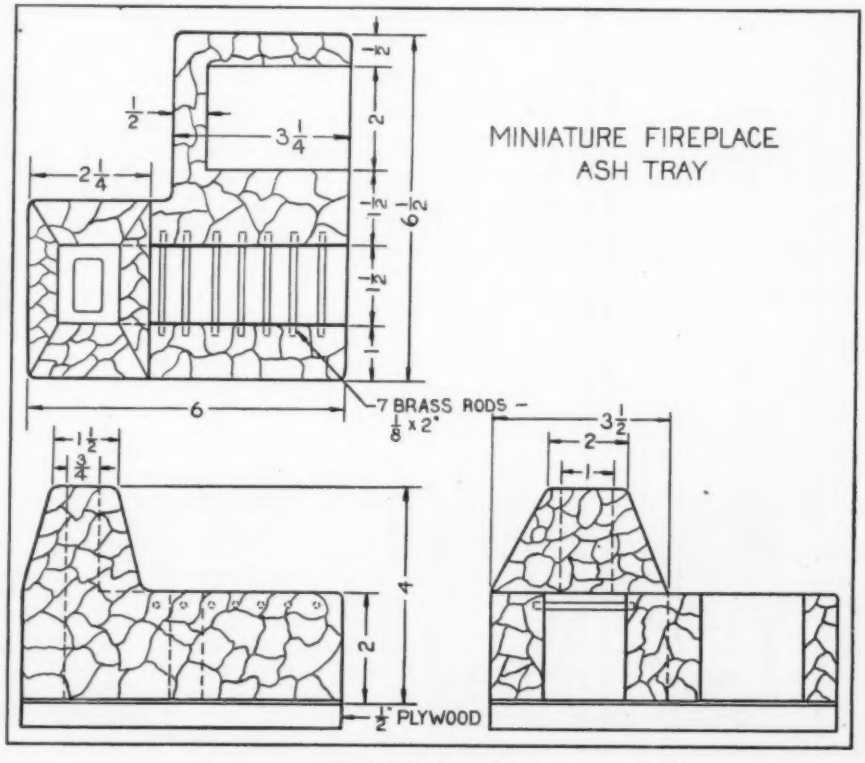


Fig. 1. Fireplace ash tray

Procedure

1. Make necessary plans. Check with instructor.
2. Obtain field stone and break up into small pieces with a hammer.
3. Make a layout, and cut, bend, and solder the forms about which the stone and mortar are to be placed. Tin plate or galvanized iron may be used. Add 7 ⅛ by 2-in. rods.
4. Obtain and shape a piece of ½ by 6 by 6½-in. plywood for the base.
5. Tack the metal forms into position on the plywood base.



The fireplace ash tray

6. Mix two parts of sifted sand with one part of cement; add water gradually during mixing. The amount of water is to be approximately equal to the volume of cement.

7. Wet down the base and set stones. Place the mortar and stones around the forms in such a manner that the stones will be kept secure and have the best face showing. Build to resemble the photograph. Smooth the exterior of the mortar.

8. Allow cement to dry.

9. Wash ash tray with used pickle — nitric acid and water in which copper has been cleaned. The used pickle gives an attractive greenish tint to the metal.

10. Paint inside of forms and base black.

11. Peened copper trays add to the appearance of the project.

12. Add felt to the base.

Teachable Topics

Operations

Making plans; layout; cutting sheet metal; bending sheet metal; soldering — tinplate, copper; cutting plywood; finishing — wood, metal, mortar; mixing mortar; setting stones; cleaning mortar; painting; pickling; peen; cementing felt.

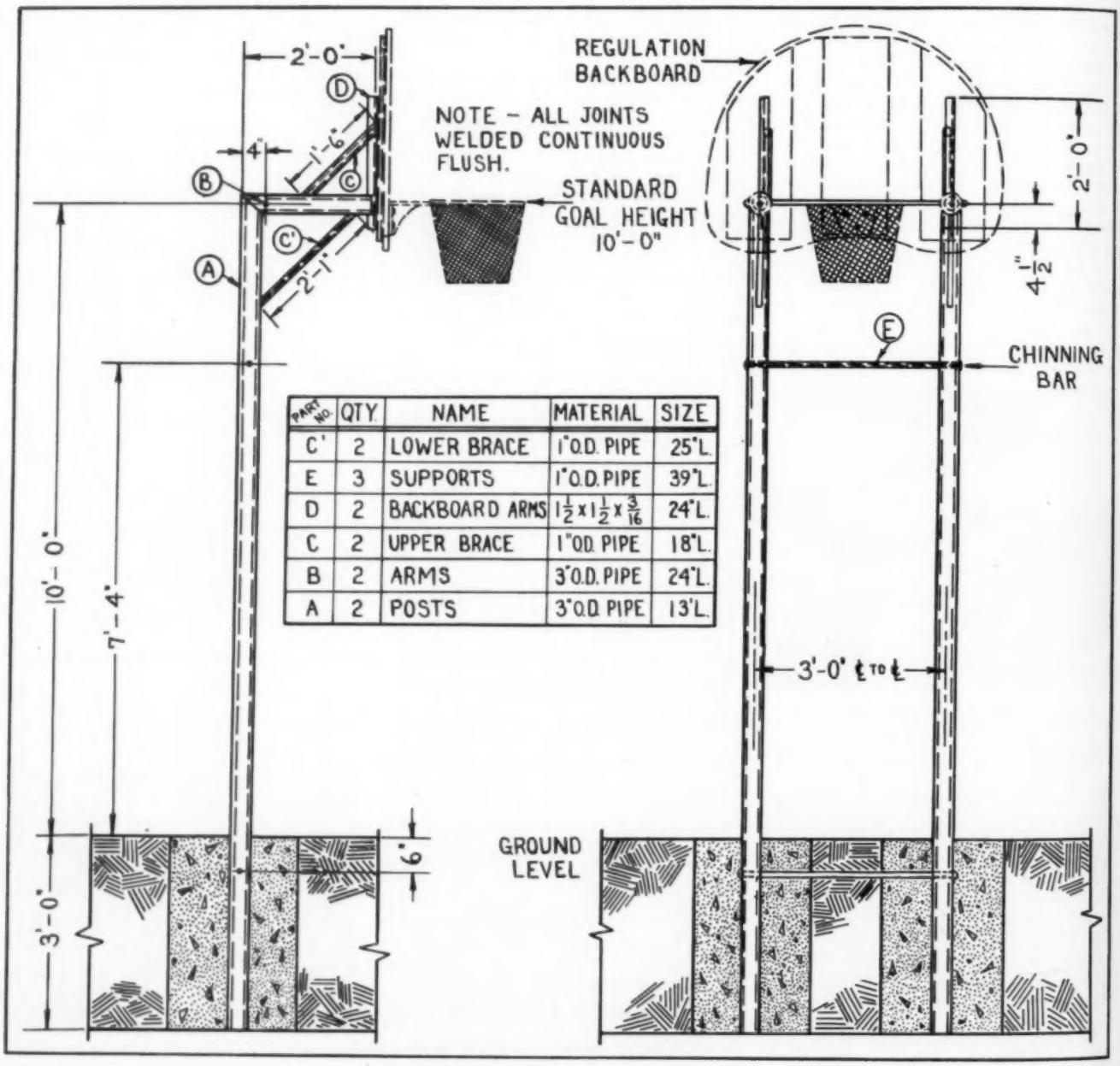
Materials

Stones, portland cement, sand, plywood, paint, pickle, copper, tinplate, felt, iron rods, solder, mortar, clean water.

BASKETBALL GOAL STANDARDS

GEORGE N. DUERKSEN
Drafting Instructor
East High School
Wichita, Kans.

This project is one of the outgrowths of an assignment that called for designing of something practical. Such an assignment is always welcomed by students who have spent a goodly share of their time in the practice of drafting fundamentals. As it should be, the plans for making should start on the drafting board. The original idea may come from elsewhere.



PART NO.	QTY.	NAME	MATERIAL	SIZE
C'	2	LOWER BRACE	1" O.D. PIPE	25"L.
E	3	SUPPORTS	1" O.D. PIPE	39"L.
D	2	BACKBOARD ARMS	$1\frac{1}{2} \times 1\frac{1}{2} \times \frac{3}{16}$	24"L.
C	2	UPPER BRACE	1" OD. PIPE	18"L.
B	2	ARMS	3" O.D. PIPE	24"L.
A	2	POSTS	3" O.D. PIPE	13'L.

Basketball goal standard

The student may have had related training in woodwork or welding. If not, the instructor should, whenever shop practices involve a phase of drafting, take the student to the shop to observe fabricating procedures. I firmly believe that it is asking the impossible when one requires design problems of students who have had very little or no actual shop experiences.

It was through splendid co-operation of the woodwork, the machine shop, and the welding instructors that this project fast became a reality. As previously mentioned, the standards were wholly designed by a drafting student. It required research as it is of such a nature that it must meet accepted standard measurements required in the game of basketball, such as: size of goal, its distance from the backboard, the backboard dimensions, the height of the goal from the ground, horizontal extension of goal from posts, etc.

The pipe, angle iron, and rod were purchased at a scrap iron yard. The backboard could be made of 5-ply plywood, ¾ in. thick, but in this case 1 by 8-in. pine was butt jointed and glued and has proved very satisfactory.

It will be noted that the posts are tack welded by a short 1-in. pipe which, after installation, is just under ground level. This was primarily done to insure ease in loading and transporting and proved very helpful in erecting as it kept the posts rigid and parallel. The chinning bar is an addition which gives the project a twofold value. Both, the chinning bar and the lower brace are best welded to the posts and not inserted.

The backboard is here referred to as regulation. The dimensions were obtained from the national accepted dimensions which appear in the games rule books. As the dimensions do not appear on the accompanying drawing, it is shown in phantom to locate its installation. The vertical wood braces are bolted to the angle iron with three ⅜ by 2 in. carriage bolts. The 3 holes in the angle iron are drilled 2 in. from each end and one in the center.

Finish. After assembling, which is completely done before erecting, the entire assembly is given one coat of aluminum paint. After this has well dried, all the metal except the goal and its brace is given a second coat of the same. The goal and the brace holding it are then finished with the regulation orange colored paint and the backboard, both sides, a coat of outside white.

Erection. Dig the 12-in. diameter holes to the required depth, call on three or four friends, prepare a mixture of concrete. When erecting, have a level at hand. After all is set properly, enough dirt should be put in the holes and stamped to insure stability. Pour the prepared concrete in the holes and allow to set. It is an excellent idea to round the top surface of the concrete above the ground level. If this is not done, rusting of the pipe will take place at ground level or slightly below because water will collect there rather than drain.

The efficient worker must know:
a) What has to be done
b) How to perform the work
c) Lose no time in finishing the job

WIDER HORIZONS

A. F. BICK
Milwaukee, Wis.

The American potential is astounding. Her strife today, inside and out, will be the means of awaking more of the latent strength in her heart; and the blight of her cities will challenge her to cleanse herself of aspects unbecoming to her resources; but this is no reason for schools to sit by and watch the metamorphosis. Schools are the substance of metamorphosis.

America is in need. Her need is for *stuff* in men; but even more basic is her need for *goals* in men.

Dire conditions stem from goal-poor men. To provide skills and not the goals to "skill" upon is incredible policy.

Goals are the work of schools. They grow around mental pictures and heart hungers built early in school years: hungers for freedoms to be attained.

Only wide goals, set up on the human scale, measure up to "freedom" in the original American sense. It is a "for-the-people" freedom that opposes its individualistic counterpart. Ego-centered purposes cannot be expected to bring construction; and they do not, as they prove on every hand.

It is the writer's opinion that it were better had education centered its effort on the development of broad human qualities than to have weakened our national structure by too persistent pursual of policies by which individual growth and attainment (self-limited education) had precedence over that which might have extended the American principle of service-centered education.

Properly timed and pointed studies of America's potentials in areas of wide and immediate interest, might easily have done the trick. The latent strength of the nation has emerged from schools mispurposed and individualistic, bent on personal advantage and thrills, while in fact, America needs men willing to give service: to give and not to take.

Today, schools face changed times, changed emphases, and changed approaches. Old conditions died in the wars.

Serene homes are replaced by sonic *hours* and *TV acts.* Jitter fills the air. Initiative, the *stuff* of our early federal years, is thinning out. The citizen sits, the *commercials* come freely; everything is *free;* entertainment, protection, security: seemingly, the world is his.

Children come to school fed with vitamins until they all but fly. They come with a spirit of unrestraint, having little home responsibility comparable to the wood stove era. They are pre-fed the facts of history, geography, social usage, and life stepped to a near adult level, and it comes to them voluminously with mirth and rhythm, color and music, and above all, speed, over radio, television, movie, magazine, billboard, and comic strip. The inner turmoil must be amazing, but this is the prelude to school.

In innocent moments, teachers opine that *children are different.* Surely teachers are aware of the times. There is an ever widening abyss between the times and school. Schools are *slow.* Newness and speed are the human need today. The common man is trained to high velocity by custom; by swift moving panoramas, and by speedy means of communication. He views insignificant items as in a large whole view. Details are casual.

Not so in schools. Insignificances in relation to the wide purposes of constructive life are accorded time out of proportion to worth. Progress to the point seems lumbering. The real goal is many times not touched.

There are now two points:

1. The *goal* must be set beyond the self.
2. Methods must be set to the times.

If these are achieved, there is hope for tomorrow. The potentials, both of children and of the times, remain as before: beyond all human capacity to encompass.

How shall we apply these principles to industrial arts?

It might be well, obviously, that its aims be set above those which stress self-centered objectives, and that its methods be fit to a 1950 America with a view toward reaching a larger measure of her vast potential.

To do this, part of shop time, at least, must be given to wider human goals as they may be viewed and built while working upon "Tomorrow," the most conspicuous and typical phase of which is our environmental civic aspects. This is but one channel, but it has many advantages over lesser phases of the human picture.

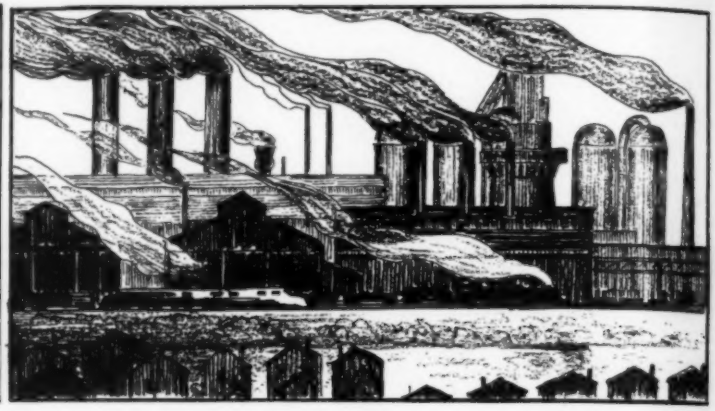
Specifically, the matter rests on types of projects and their introduction.

The large mass of present-day shop projects are designed toward student self-interest: his taste, his pride, his skill, his advancement, his future, his pleasure, his financial independence, etc., largely his island universe, independent of the wide human hungers and injustices. Yet, there is no period in history as needy for men who can throw the tea cargo overboard; men who can stand on two feet in defense of the purposes of freedom on the wide human scale.

To hear this may be galling. It is ever so convenient to continue down familiar corridors than to cut new ones; and yet, we have before us evidence of civil and national weakness, our affairs admittedly the lowest low in history while our science and skills are the highest high; our environments rotting and filthy, and the majority of our people living in the midst of some form of blight, without benefit of education, accepting and condoning conditions unfit for intelligent citizens.

Were the way opened for boys to plan and build, even though in miniature, the new environmental goals of an American *tomorrow,* you might see a miracle of immediate interest, you might see an amazing understanding of the philosophy of environmental freedom, and you might sense a keen appreciation of need for the relief of human hungers and for freedom from the disorder that surrounds us. There might grow almost instantly the willingness to defend the new ideal, and with it might surely come a sense of strength and decision to go through with it. These results,

The 1893 world's fair



Steel mills

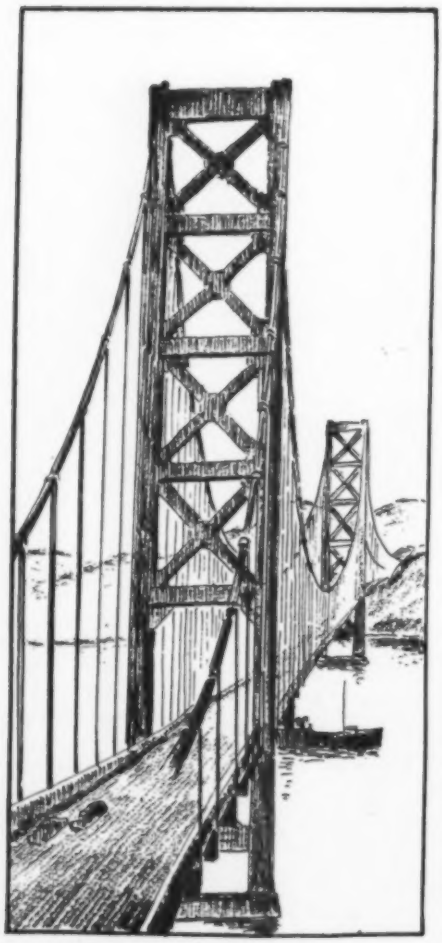
we have found, follow inevitably the building of new and vivid mental pictures of attainable goals from out of the vast potentials at hand.

With the foregoing as an introduction, that which follows is the content of an initial presentation before a class of beginners in woodshop, on the junior high school level.

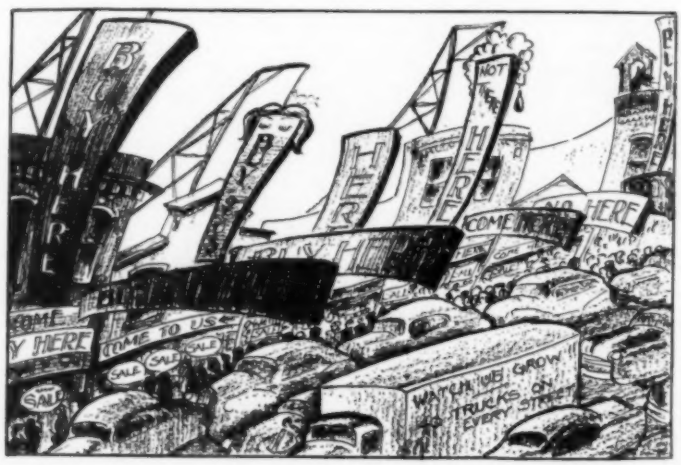
The writer has made large 28 by 42-in. crayon sketches, of which the accompanying illustrations are reductions. These are turned down next to him. He also has several colored models of possible community redevelopments. These also are covered up because he makes much of the surprise motive. He also takes advantage of the value of familiar problems: the area shown redeveloped is a near-by shopping block.

(Speaking to the boys).

Our nation has a vast potentiality, and so have you a limitless potentiality.



Golden Gate bridge



Congested and unsightly

In 1893, we built the Chicago World's Fair in white plaster and in Greek style, as immaculate and magnificent as we might imagine a fairy palace to be. Then we tore it down. The last seems as foolish to you as it did to me when a boy, and even now I feel, had it been built in American style to remain permanently, it might easily have advanced our nation by a century.

In the early twentieth century, we built vast steel mills; and in the 30's, the Golden Gate Bridge, both showing our engineering ability as a people.

A man from Venus might wonder, "With such skill and imagination, what beauty must these people have created in their cities!"

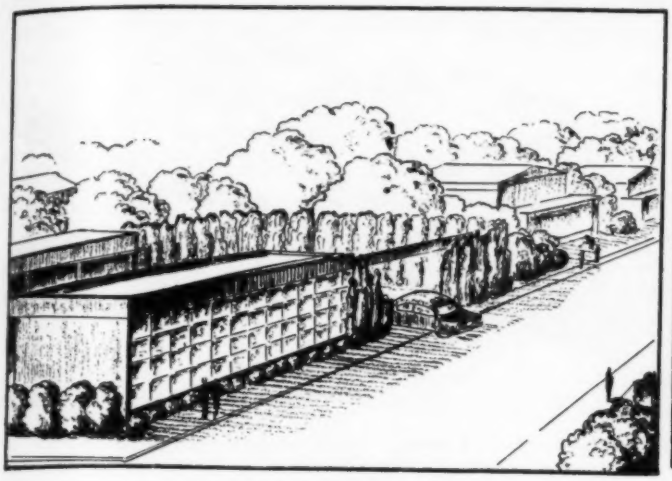
Instead, what a picture for a great people is represented by the heart of our city.

The gross waste of such obsolete business areas cost cities their self-respect; it costs surrounding areas their stability, blighting them and their people; it weakens their moral fiber; and it causes sales losses to merchants of millions of dollars annually.

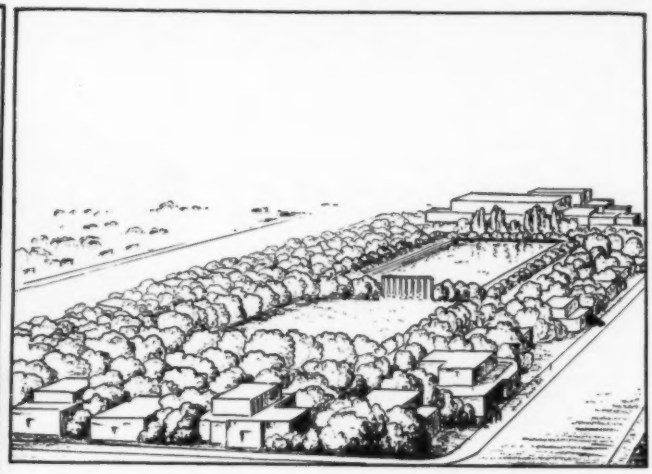
Out of consideration for the human hunger for unity and continuity, and with no more effort or cost, they might actually have built a paradise in America; and even now, a new *tomorrow* might be built each twenty years out of the wastes of today.

Our people need to be shown how this may be done: they need to see concrete figures of the economy of reconstruction; and we have the facilities to do it.

The point is shall we design and build a miniature of our near-by neighborhood shopping area and present the model to the people, giving impetus to the movement for constructive design in our city? We might show how *unity* in a shopping area is advanced through simple planning and rebuilding over a period of time, and we might show how,



Redesigned filling station

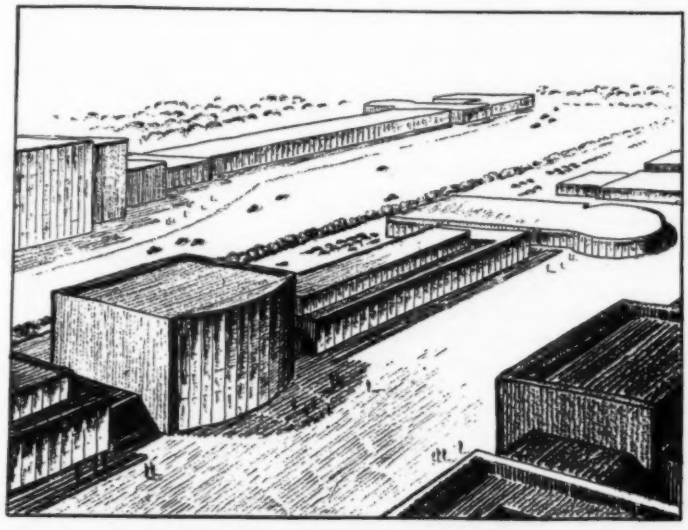


Beautiful home sites

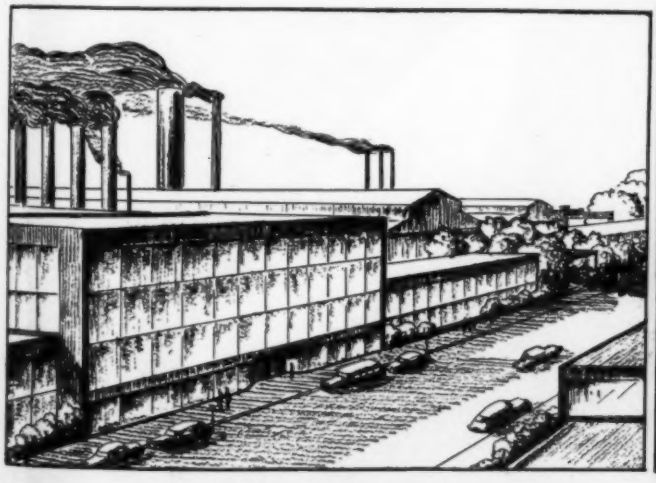
even more economically, it may be rebuilt at once, bringing immediate returns and replacing the insufficient present with unity buildings extending any number of blocks as apparently one structure having a strong and magnificent aspect, dominated by an important mass on the sight of the community theater, and supported by subordinate masses at the First National Bank and the City Hotel, the entire structure with wings sweeping outward working toward strength and unity. The clutter of signs is gone as are garish fronts and displays; the people walk through central all-weather indoor promenades from one end of the area to the other.

Thus in return, shoppers come from a 20 per cent wider area; they come 20 per cent oftener, and they buy 10 per cent more at each purchase. This amounts to additional millions in gross sales annually.

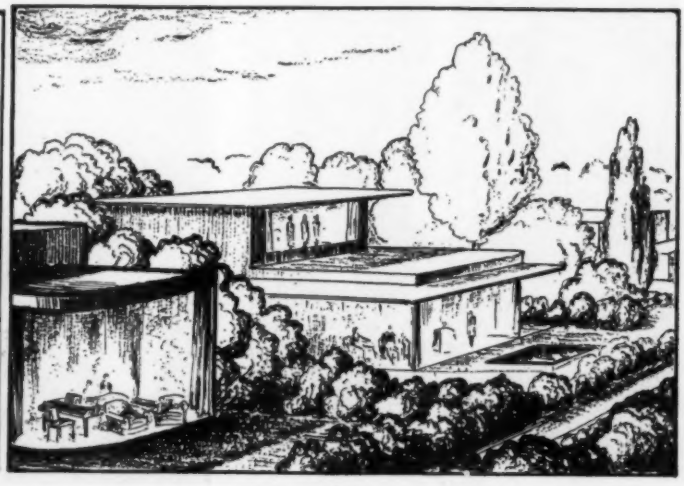
A like principle of *unity* may be applied to industrial areas.



Redesigned shopping district



Sightly industrial centers



Homes of tomorrow

Filling stations, coal yards, auto lots, and city approaches might as easily be screened to fit the theme of unified reconstruction.

The design of the residential area can also be reversed, offering greater happiness and uplift to its people.

In this plan, the home is spacious. It is built largely of glass on the garden side, where living rooms overlook an unbroken expanse of park.

At this point, our classes design the City Tomorrow, first individually, and later, in groups, coming out with a unified plan and front elevation which are then executed in wood, flat paint, and rubber sponge.

Thus new goals are built, mental patterns are vividly drawn, procedures are shown, and willing services are given.

Project Two

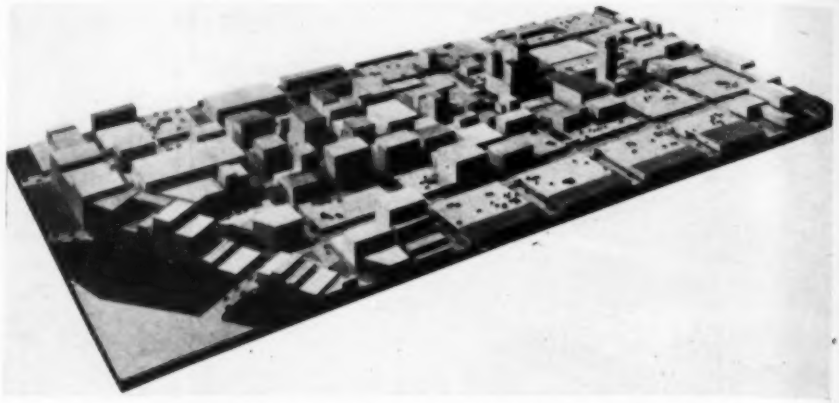
Here, both objective and approach differ from those just given.

To know the national potential, the individual resource, and the national need are our ends.

Bridges, the economy of truss and suspension structures, the challenging problem of a mile-wide span, the national out-of-doors, speed, roads, and *tomorrow;* these are subjects of discussion.

Mechanical drawing opens the way, and then models, small and large, lead the boys to thrilling experiences. The model illustrated is the second of its kind built by the school. It measures forty feet and carries as many as a dozen children at a time. The superintendent, principal, and faculty, plus children of the entire school crossed it, not without mathematical proof, and yet, the vertical cables were merely strings.

Not only do such projects offer excellent opportunities for integration, bringing together under one core all the academic areas of study, but we work on wider horizons, and we build men with a view beyond themselves; men who possess a clear mental picture of the patterns to be fought for and attained; men who have experienced participation in service for the public good. They do not fear to speak, nor will they fear to act; they are not accepters of the status quo. They are not likely to condone the present blight and inconsistency of building, nor will they take for granted the unthinking incongruities, that stem from present policies of environmental growth. They are, we feel, fit builders of *Tomorrow!*



Mr. Bick's model of a city center, Maryland Avenue and Hartford Avenue School, Milwaukee

Studying bridge trusses — Milwaukee Journal Photo

INDOOR MODEL PLANE

CHARLES J. COWARD
Eastport High School
Eastport, N. Y.

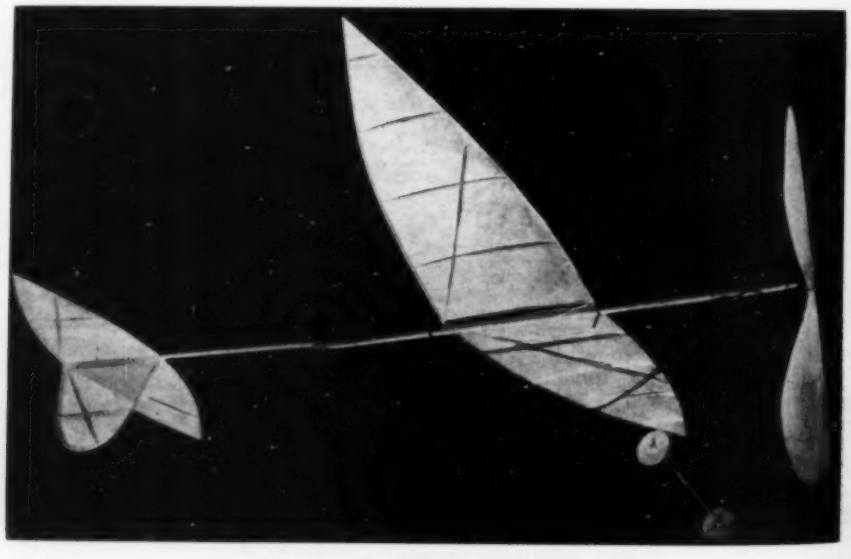
The need for a high-performance, beginner's *rise-off-ground* model was considered in the accompanying design. It was found that by eliminating hard-to-make wing clips and complicated structures this model could be constructed by the grade school child. The speed with which the model may be constructed is another feature worth noting. All dimensions are critical and must be laid out accordingly.

Fuselage: Dural bearing is fastened as shown with glue and silk thread. The tail boom should be offset a few degrees to the left to permit model to turn *with* the torque.

Wing and tail surfaces: The frameworks are covered with superfine tissue on upper surfaces *only*. Do not shrink tissue after covering as is usually done with outdoor models, and also omit doping to prevent warping of frame. After covering, wing is glued to wing mount, which in turn, is held to fuselage with rubber bands.

Propeller: The propeller must be carved carefully and slowly to insure accuracy. Trim to pattern on plan and finish with No. 6/0 sandpaper. Perfect balance is necessary for good flight characteristics.

Flying: Wind rubber motor quickly by removing loop from rear hook, and fastening to hook inserted in electric drill hand-type. Ascertain number of r.p.m's of drill and pack



Indoor model plane — Photo by Bohall

approximately 2000 turns into s-t-r-e-t-c-h-e-d rubber motor. It is suggested that the rubber band be lightly coated with a few drops of green soap and glycerin to prevent premature breakage. Launch model slightly nose-high and adjust if necessary. Wing can be moved easily upon fuselage due to the fact that it is fastened with rubber band.

APPLE BOXES FOR SHOP USE

ARNOLD S. CARLSON
Twin Valley, Minn.

1. Projects
2. Storage of projects

In the small high school in a not too wealthy community there seems to be the difficulty of paying for materials used by the students.

This fact confronted the writer in his seventh-grade industrial-arts class, and it was up to him to select projects which would cost very little to the boys and to the school.

We were fortunate that the oversupply of apples for the school lunch program came packed in wooden boxes. The cooks kindly turned these boxes over to the industrial-arts department.

The boxes were dismantled and the salvaged wood proved very useful in the woodworking shop. Model farm homes and buildings proved to be of great interest to the boys. The first step in this work was to study the plans of various types of buildings. Then freehand preliminary sketches were made, and after scale drawings of floor plans and elevations had been made, the building of model houses began. The following manipulations were carried out by the student in his work.

1) Studying the plans of houses that had been selected; (2) sketching; (3) scale drawing; (4) using the hammer; the square; rip-, crosscut, and coping saws; file and rasp; jack and block plane; (5) gain skill in sanding and nailing, and in painting.

Outcome of Projects

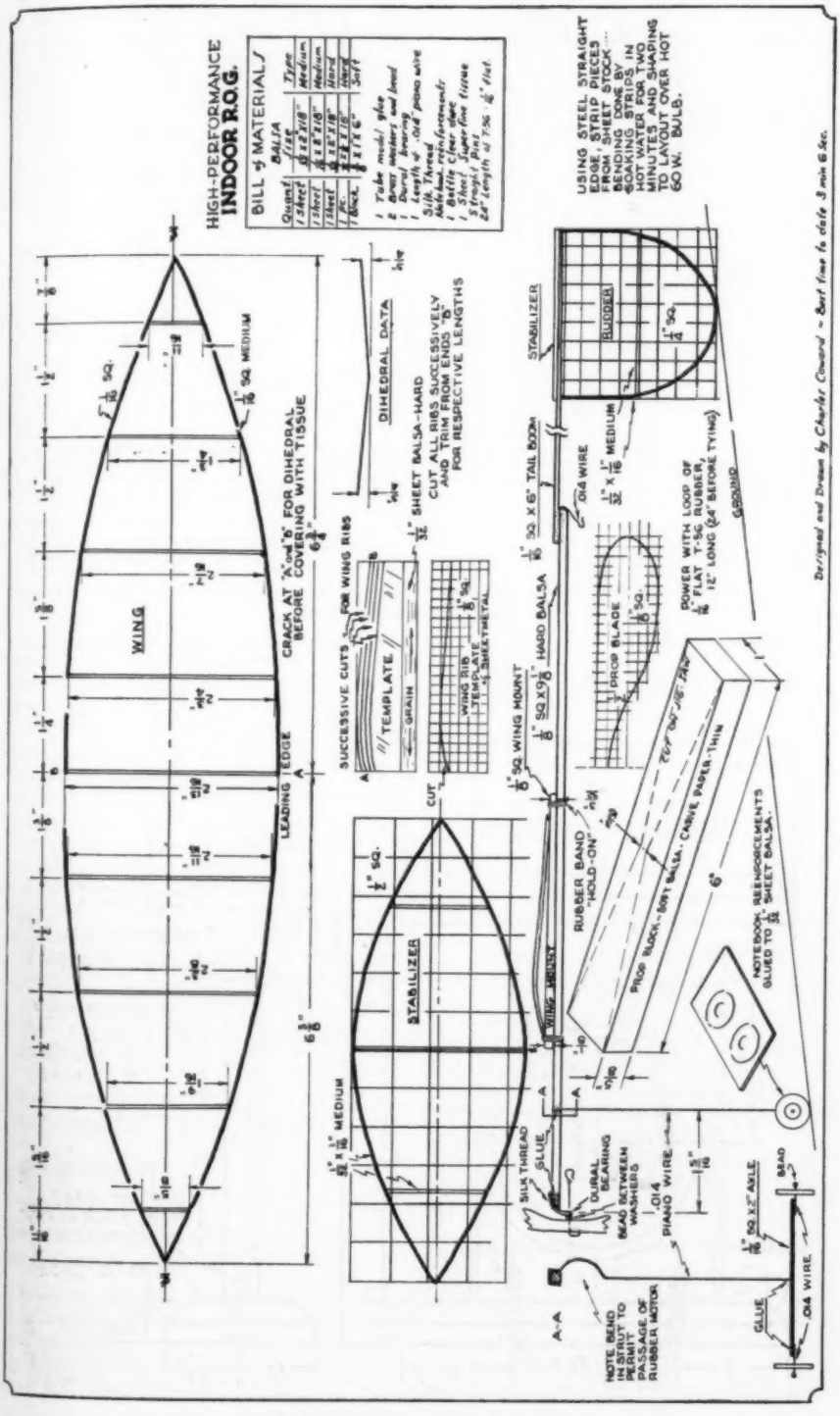
1. Develop initiative and skill in planning.
2. Learn how to use various woodworking tools.
3. Develop an appreciation of good workmanship in project building.
4. Learn how to appreciate what has been done by others.

Storage of Projects

The shop in which the writer is working is handicapped by the lack of storage space and overcrowding. Steam and water pipes along the concrete walls which are made of concrete makes it very difficult to build any place storage cabinets.

To overcome this, the boxes that were not needed in the project building were placed in spaces which otherwise would have gone to waste. The boxes are small enough so that they will fit into small spaces, and sturdy enough that they will form a fairly steady rack. They were placed one above the other in such a manner that each one formed a shelf or storage pocket.

There are now enough storage bins for all the projects that are made in the shop.


HIGH-PERFORMANCE
INDOOR R.O.G.
BILL of MATERIAL
WING
STABILIZER
TEMPLATE
DIHEDRAL DATA
SHEET BALSA-HARD
CUT ALL RIBS SUCCESSIVELY AND TRIM FROM ENDS "B" FOR RESPECTIVE LENGTHS
CRACK AT "A" and "B" FOR DIHEDRAL BEFORE COVERING WITH TISSUE
LEADING EDGE
SUCCESSIVE CUTS FOR WING RIBS
GRAIN
WING RIB TEMPLATE of SHEETMETAL
USING STEEL STRAIGHT EDGE, STRIP PIECES FROM SHEET STOCK ... BENDING DONE BY SOAKING STRIPS IN HOT WATER FOR TWO MINUTES AND SHAPING TO LAYOUT OVER HOT 60 W. BULB.
RUDDER
STABILIZER
TAIL BOOM
.014 WIRE
DROP BLADE
POWER WITH LOOP OF 1/4" FLAT 1/16" RUBBER, 12" LONG (24" BEFORE TYING)
GROUND
WING MOUNT
RUBBER BAND "HOLD-ON"
WING MOUNT
PROP BLOCK—SOFT BALSA. CARVE PROP THIN
NOTE BOOK REINFORCEMENTS GLUED TO SHEET BALSA.
SILK THREAD
GLUE
DURAL BEARING
BEAD BETWEEN WASHERS
.014 PIANO WIRE
BEAD
GLUE
.014 WIRE
NOTE BEND IN STRUT TO REMOVE SLACK OF RUBBER MOTOR
Designed and Drawn by Charles Coward - Best time to date 3 min 6 Sec.

Details of indoor model plane

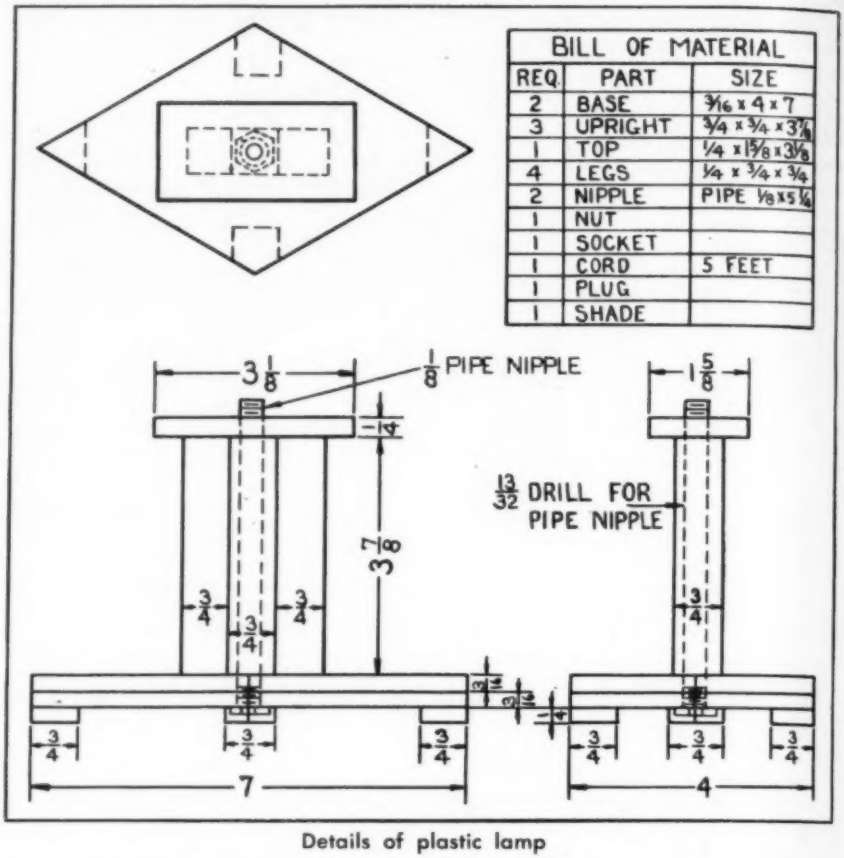
PLASTIC LAMP

EDWARD BARSKI
Public Schools
Stillwater, Minn.

This plastic lamp is an attractive project for the industrial-arts class. Plastics are fast becoming a medium of expression in industrial arts and this lamp will interest the boy in plastic work.

Many color combinations can be used in making this lamp, but perhaps it is best for a

Plastic lamp



Details of plastic lamp

beginner to use only two colors that harmonize with each other.

The base is made of sheet plastic — two layers of 3/16-in. sheet being glued together. The three cast resinoid pieces that form the upright of the lamp are ¾ in. square by 3⅞ in. These are glued together as indicated in the drawing.

The bottom is fastened to the body with No. 6–32 by ¾-in. f.h. machine screws. Self-tapping screws No. 4 by ⅝ in. may also be used, but these must be turned into a hole slightly smaller than the diameter of the screw.

A hole is drilled through the center piece to accommodate the ⅛ by 5¼-in. length pipe nipple as the drawing indicates. The pipe nipple is fitted with a nut on the bottom; when the light socket is screwed on top, then the base, the upright, and the top are held firmly together.

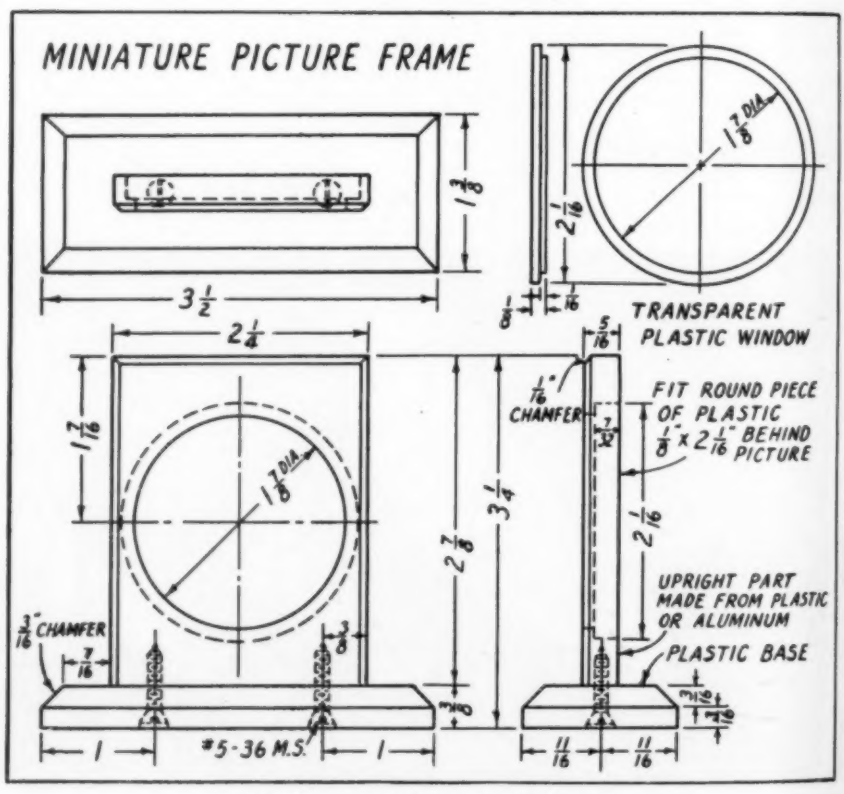
MINIATURE PICTURE FRAME

C. H. CONNALLY
East Texas State Teachers College
Commerce, Tex.

The miniature picture frame may be made entirely of plastic or part plastic and part metal. The base may be made of clear or colored plastic. Aluminum may be used for the upright as it is easy to work and takes a nice finish. The aluminum may be finished either by drawfiling with a smooth mill file or polished on a buffer.

Procedure

1. Lay out and square the upright part to size, as shown.
2. Cut chamfer on edges.



Details of miniature picture frame

BILL OF MATERIALS

No. of pieces	*Material*	*Size*
1	Plastic or aluminum	5/16 x 2¼ x 2⅞ in.
1	Plastic	⅜ x 1⅛ x 3½ in.
2	Plastic	⅛ x 2 1/16 x 2 1/16 in.

3. Locate center and cut out opening for the window. This may be done by setting the rectangular piece in a 4-jaw chuck, and turning it out on a metal lathe; or, by mounting it to the faceplate of a wood lathe. Attach a piece of wood to the lathe faceplate. Drill a hole in the center of this piece of wood and a similar hole in the center of the upright part. Attach the two pieces together with a ¼-in. stove bolt. With the parting tool, cut the larger diameter down to the shoulder and then cut the center piece out to the smaller diameter. Slow the lathe speed down before finishing the cut.

4. Locate the point for the machine screws in the upright part and drill holes with a No. 40 tap drill.

5. Tap holes for No. 5–36 MS.

6. Lay out and square the base to size.

7. Locate center for holes and drill with ⅛-in. drill.

8. Countersink the bottom of holes for machine screw head.

9. Lay out and cut chamfer around top edge of base.

10. Select a piece of ⅛-in. clear Plexiglas for the window frame and cut oversize ⅛ in. to a round shape. Cut this on the jigsaw or coping saw.

11. Place this piece of plastic between two small blocks of wood and mount this on either side of the spur and cup center of the wood lathe. The plastic is held in position by friction while being turned to shape. Cut the offset around the edge with a square nose or diamond point tool.

12. The rear plastic disk can be turned to size the same way; however, it should fit tightly in the window opening in order to secure the picture in the frame.

13. Use emery cloth on the aluminum frame, and then polish on the buffer. A draw-file finish may be given the metal if desired.

14. Sand the plastic with a No. 4/0 sandpaper and polish on the buffing wheel.

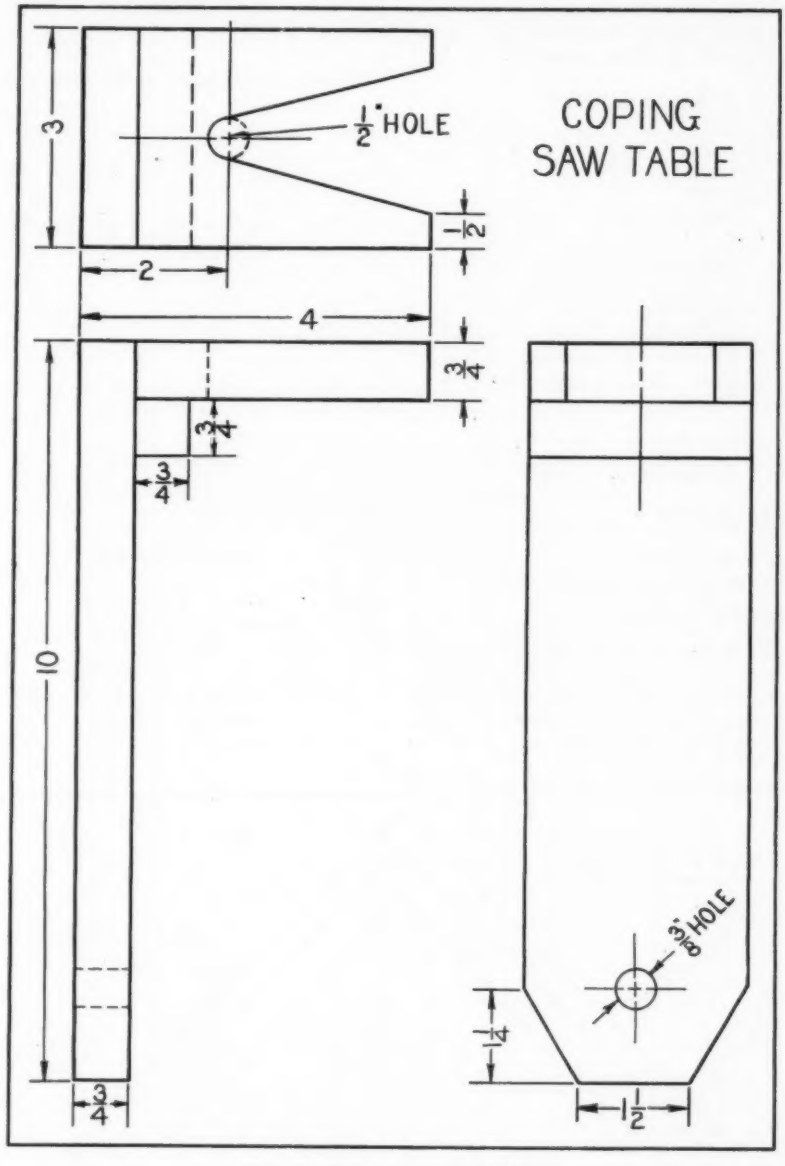
15. Assemble parts with No. 5–36 machine screws.

16. Apply wax and rub with a clean cloth.

COPING SAW TABLE

JEROME LEAVITT
Principal on leave
Canyon Elementary School
Los Alamos, N. Mex.

A coping saw table is fastened in a vise, or it is clamped to a bench so that it can be used for supporting pieces of wood when they are being cut out with a coping saw. The same table can be used in connection with jewelry or sheet-metal work when a jeweler's saw is used in place of the coping saw.



Detail of coping saw table

To use the table, fasten the long leg in a vise or clamp it to a bench so that the top piece is the correct height for holding the piece of wood which is to be cut out. Remember, a coping saw is only used for cutting curves and circles in thin wood.

Any wood ¾ in. thick, that is in good condition and does not contain splits or knots, may be used.

How to Make a Coping Saw Table

1. Find a piece of wood ¾ by 3 by 10 in. Cut off the corners on the lower end as shown.

2. Using your ruler, square, and handsaw, mark and cut the leg piece 10 in. long.

3. By using the same tools and a piece of wood ¾ by 3 by 4 in., cut out the top piece.

4. Cut a piece ¾ by ¾ by 3 in., for the corner piece.

5. Next, drill the ½-in. hole, as shown, to provide a means of hanging up the table.

6. Lay out the pattern on the top piece, and drill the ½-in. hole as shown.

7. Cut the *V* in with the handsaw as shown on the pattern.

8. Plane all rough surfaces.

9. Glue and nail the top to the brace as shown in the illustration. Use three *3d.* nails for this purpose.

10. After you have finished this, glue and nail the leg to the end of the top and the brace. Use three nails to go into both the top and the brace.

11. Sandpaper the entire coping table until it is smooth and clean.

12. Your coping saw table is then ready for use.

One ruler, one square (try), one handsaw,

one half-round woodworking file with handle, one hammer (claw), one brace, one ½-in. auger bit, and one plane (smooth).

BILL OF MATERIALS

No. of pieces	*Name*	*Size*
1 pr.	Scissors	
1	Pencil	
1	Large sheet paper	
1	Carbon paper	
2	Sandpaper	No. 1
2	Sandpaper	No. 0
1 doz.	3*d*. Finishing nails	
1	Upright piece	¾ x 3 x 10 in.
1	Top piece	¾ x 3 x 4 in.
1	Brace	¾ x ¾ x 3 in.
	Wood glue	

SEED BOX "FLAT"

JEROME LEAVITT

Principal on leave
Canyon Elementary School
Los Alamos, N. Mex.

In the spring, even the younger children, both boys and girls, will be wanting to start seeds in the house for their own vegetable and flower gardens. Seed catalogs, books, and magazines from the library, will give a lot of information about the selection and care of seeds and plants.

Directions for Making the Seed Box

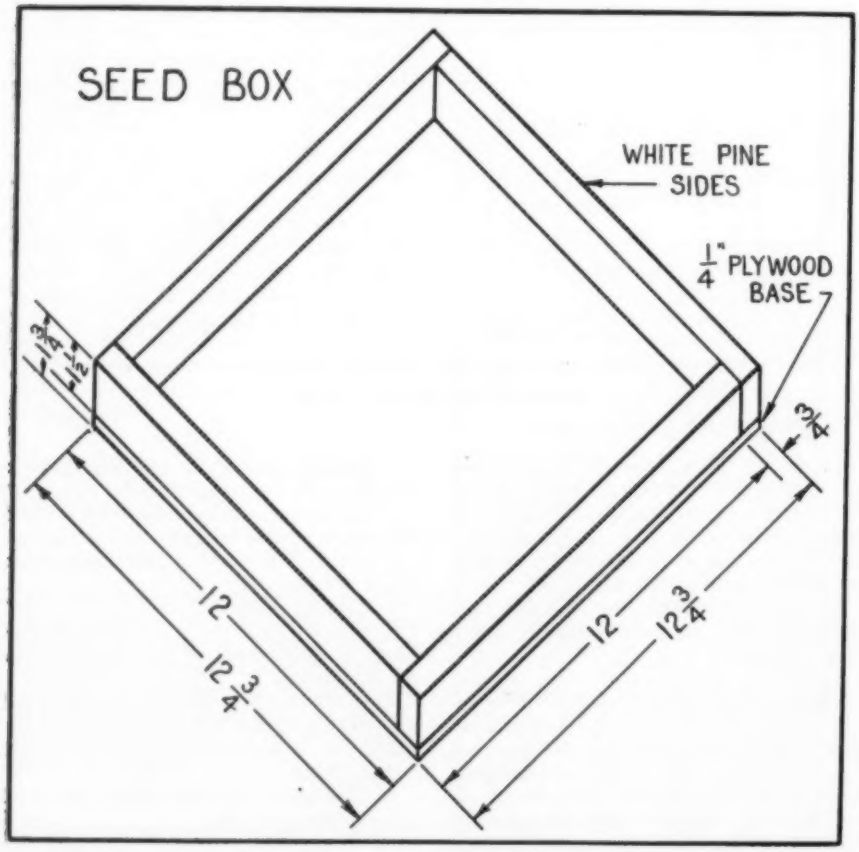
1. Collect some ¾ by 1½-in. white pine boards. Also secure a piece of ¼-in. plywood.
2. Cut four pieces ¾ by 1½ by 12 in.
3. Cut a piece of ¼ by 12¾ by 12¾-in. plywood.
4. Nail the four side pieces together so that they overlap each other, as shown in the illustration. Use three *3d*. nails on each end.
5. Next, nail the plywood bottom on the frame with *2d*. nails, spacing them about 3 in. apart.
6. Sandpaper the completed box to remove all splinters and rough edges.

Tools Needed

One claw hammer, one handsaw (crosscut), one square (try), one ruler.

BILL OF MATERIALS

No. of pieces	*Name*	*Size*
1	Sandpaper	No. 1½
1	Pencil	
4	White pine	¾ x 1½ x 12 in.
1	Plywood (fir)	¼ x 12¾ x 12¾ in.
15	3*d*. Common nails	
20	2*d*. Common nails	



Details of seed box

GRAIN PATTERNS IN WOOD

HENRY F. PEARL

Angwin
Napa Co., Calif.

To illustrate the grain patterns in wood that are peculiar to the various methods of sawing, try the following simple scheme. Cut a fairly thick cross section from a small log. Both sides of this disk-shaped specimen then illustrate the appearance of the end grain. Then cut the disk in two, making a straight cut that passes through the pith or center of the annual growth ring system. The surface made by this cut then illustrates the appearance of the grain in quarter-sawed boards. Next make a straight cut perpendicular to this surface at a point about midway between the pith and the circular or bark edge of the half-disk. The surface made by this cut then illustrates the average appearance of the grain in plain-sawed boards.

Thus you can show three grain effects in one specimen instead of using three panels of the wood. The specimen can also be a help in identifying the tree in the forest, since bark may be left on the circular edge of the specimen.

ROCKING HORSE

R. E. JENNINGS

Head, Industrial Arts Department
San Benito County High School and Junior College
Hollister, Calif.

Many types of rocking horses have been made, but most of them are either of a smaller type which cannot be used when the youngster grows up or it is a type that will topple over when rocked real hard.

The rocking horse described in this article has proved to be very sturdy, and extremely practical. It is difficult to tip it over and it can be used by young and older youngsters alike.

Plywood is recommended for this project, and marine plywood should be used if it is to be left out in the weather. The head is made of two thicknesses of ¾ plywood since this gives a strong head with minimum weight. If another method is used for the head it may offset the balance, but this can be easily compensated for by lengthening or shortening the tail or by moving the whole seat in either direction.

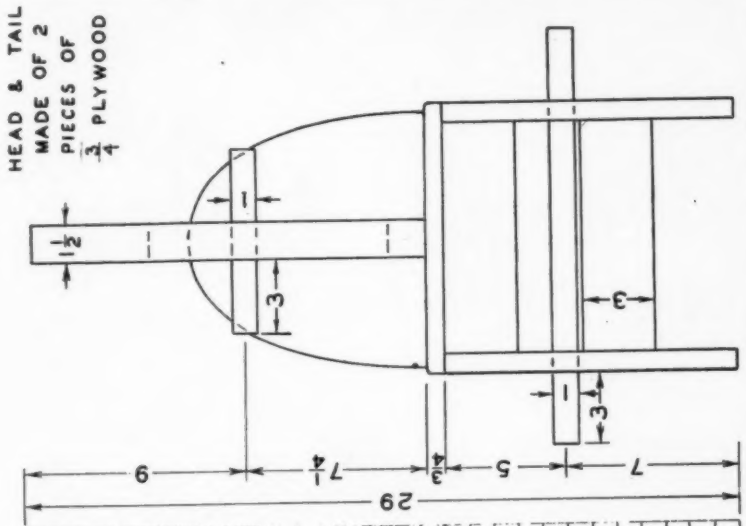
All joints should be glued with a good waterproof glue and either screwed or nailed. In either case it is suggested to sink the heads and fill them with plastic wood to give a better looking job as well as to help keep the fastening from working loose.

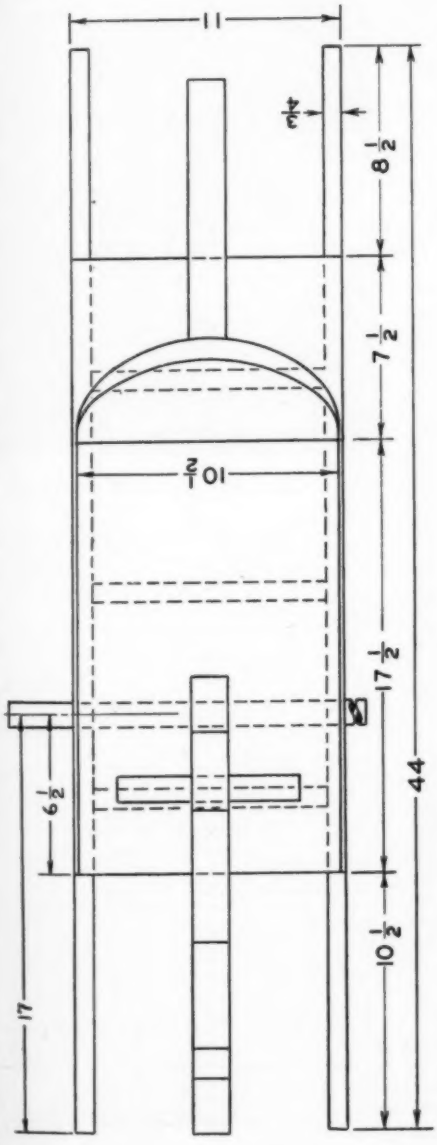
A suggested color is white horse with red or blue trim around the rockers and horse's mane. Black is suggested for high lights, eyelids, and lashes. Whatever the colors are be sure they are bright. The child's name can be added to personalize this prize possession.

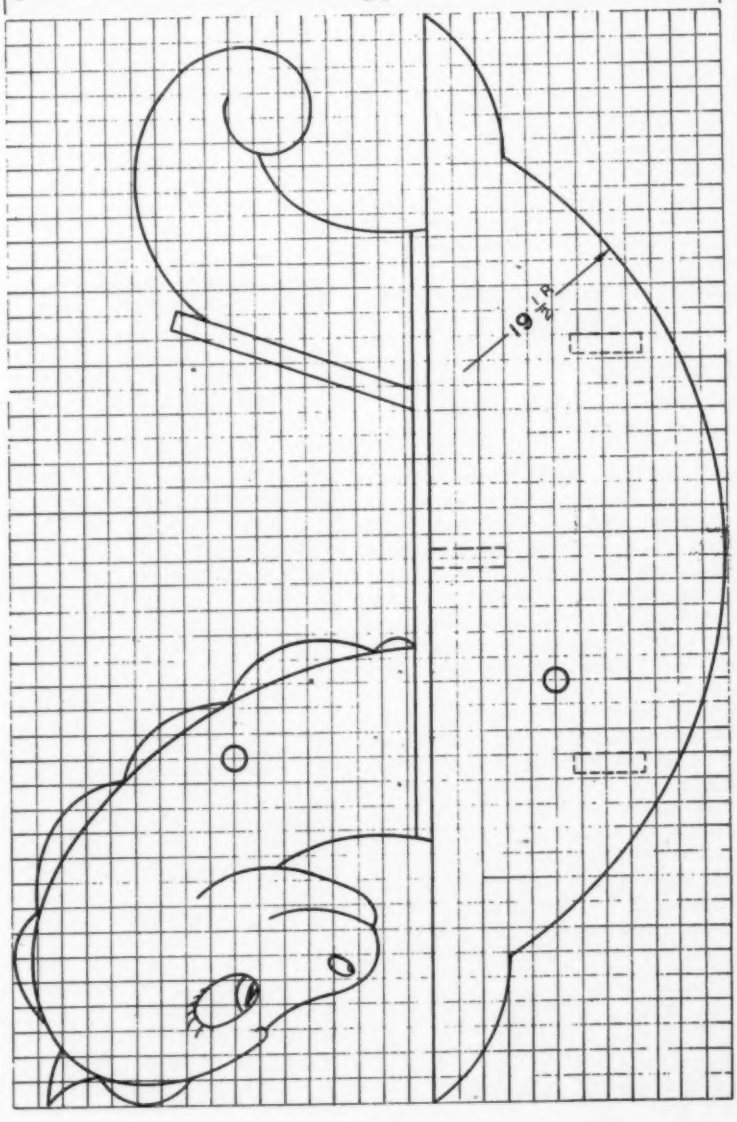
ROCKING HORSE

STOCK BILL

PARTS	PCS.	T	W	L
LEG BRACES	3	$\frac{3}{4}$	3	$9\frac{1}{2}$
LEGS	2	$\frac{3}{4}$	12	44
FOOT BRACES	1	$\frac{3}{4}$	1	17
SEAT	1	$\frac{3}{4}$	11	25
BACK REST	1	$\frac{3}{4}$	$10\frac{1}{2}$	$10\frac{1}{2}$
HEAD	2	$\frac{3}{4}$	$16\frac{1}{2}$	19
HAND GRIP	1	1	1	$7\frac{1}{2}$
TAIL	2	$\frac{3}{4}$	$11\frac{3}{8}$	14







— Photo by Thomas G. Harvey

In place of the three leg supports it is permissible to use only one support and place it in the very midpoint of the two rockers. If this type of brace is used it should measure ¾ by 9¼ by 12 in.

This horse will stand up under the roughest use.

SUGGESTIONS FOR WASHING HANDS

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High School
Lakewood, Ohio

After a period in the metal shop, machine shop, or auto shop, it is very important to wash the hands thoroughly. Most shop teachers agree on the importance of clean hands but few seem to do anything about it.

In some shops boys are allowed to wear gloves, but that is a dangerous practice around machinery, and should be discouraged.

There are lotions available that can be rubbed on the hands and around the nails which will come off easily with the use of a little water, leaving the hands in fine shape. These lotions are rather expensive and are probably used in very few schools. Then, too, there are soaps containing pumice or somewhat similar abrasives that are helpful in removing dirt. Most schools, however, probably use liquid soap, a soap powder, or each boy furnishes his own bar of soap.

Here are a few suggestions for washing the hands that will help in saving both time and material:

1. Use water as hot as you can bear and a very little of it. A pint of hot water in the wash bowl is sufficient for the best and quickest results.

2. Scoop a little water from the edge, use plenty of soap or soap powder, and rub it well into the dirtiest part of the hands and especially around the fingernails. Rub hard, using lots of soap to work up a real lather.

3. Rinse off the lather in the small amount of water. Rub any dirty places on the bowl so it, too, will be clean and then allow the water to drain off.

4. Turn on plenty of water and rinse hands, and if necessary, wash your face. Rinse hands in cold water to close the pores and prevent chapping. This is especially important during the winter and early spring.

5. Dry the hands and then go over the wash bowl just as all travelers do on a pullman. Leave the wash basin and wash room in such a condition as would meet the approval of your mother. This is good citizenship, a good example for the rest of the class, and a good practice to follow throughout life.

It is important to stress points 1 and 2 by demonstrating to each class. It may also help to have the science teacher explain why a little hot water and plenty of soap work so effectively in cleaning the hands.

AN ELECTRICAL QUIZ BOARD

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Volta School
Chicago, Ill.

In any modern school shop, whether it be general or unit, with the current emphasis on informality, the electrical quiz board will prove its worth in provoking pupil interest and for teaching nomenclatures and identifications of almost endless variety. The quiz board is an auxiliary training aid somewhat comparable in use to the bulletin board but far more intriguing from the pupils' point of view. It is used by the pupils during free moments when they must suspend regular activity while awaiting their turn on a machine or individual help from the instructor. The board illustrated has been in use in the author's shop for the past three years and pupil interest has been unfailing. By using the quiz board during the first two weeks of each semester for tool identification it has actually been possible to eliminate entirely the formal presentation of that lesson. The pupils seem to take pride in being able to pass the "buzz board test" whereas the conventional tool lesson is only yawn provoking. Once the board has been constructed and installed there remains only the matter of obtaining a sufficient number of card sets which are changed from time to time with a frequency dependent upon the individual shop situation.

It is often easy for the instructor to decide that equipment of this type is desirable but

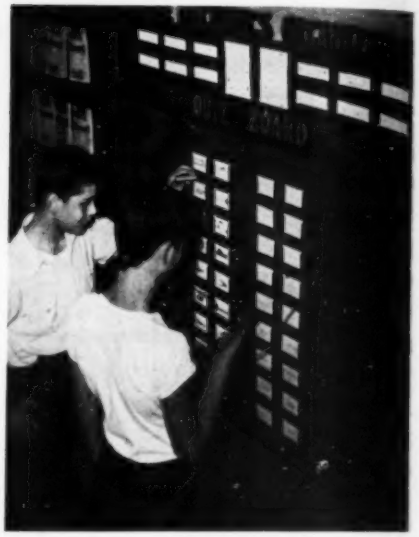


Fig. 1. The quiz board

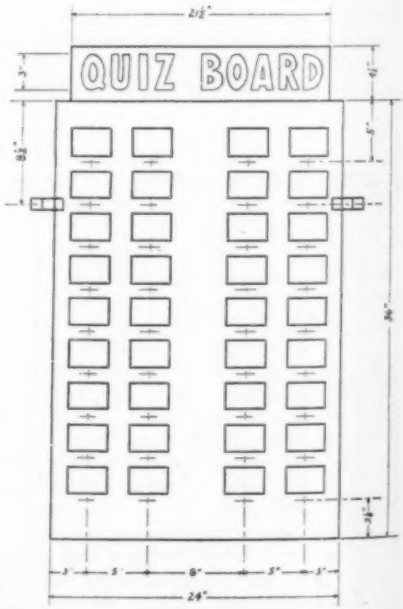


Fig. 2. Details of quiz board

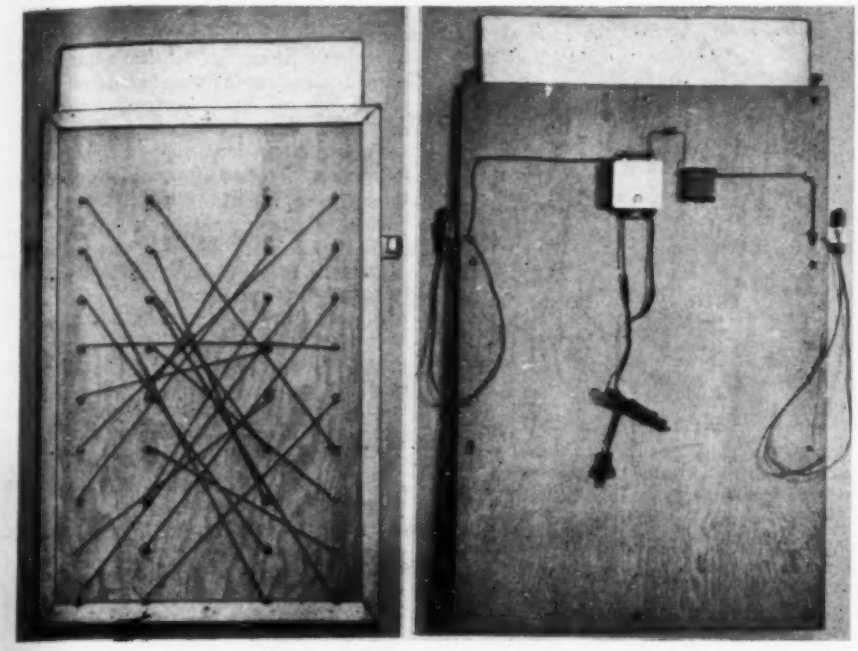


Fig. 3 at left. View of back with circuit panel removed shows detail of wiring. Annunciator wire is used. While the positions of the wires can be changed it has not been found to be necessary because of the difficulty of remembering the relative positions of eighteen pairs of card holders. Fig. 5 at right. View of back with board completely assembled. Picture shows buzzer circuit. Panels fastened with 3/16 by 1 in. stove bolts.

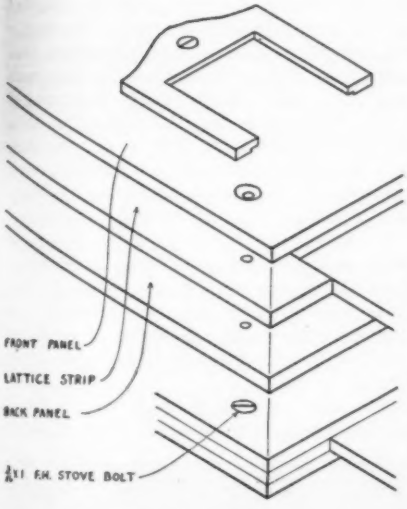


Fig. 4. Detail of assembly

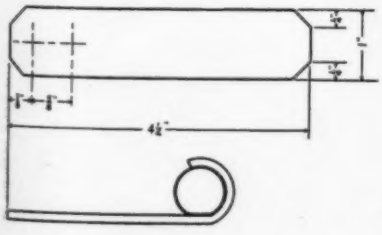


Fig. 7. Brackets for assembly

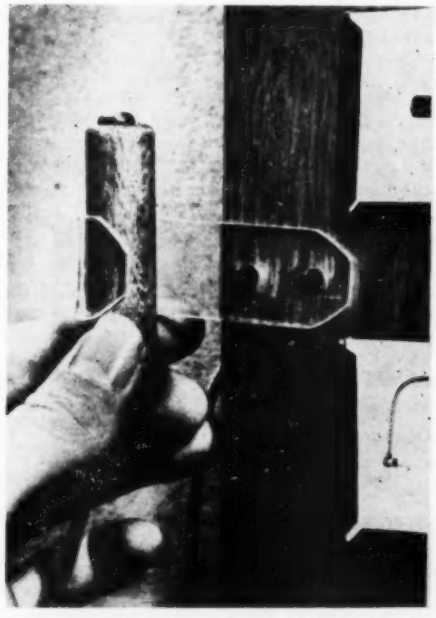


Fig. 6. Clips made of .125 plexiglas hold the contacts when the board is not in use

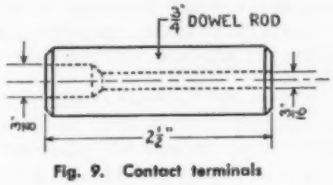


Fig. 9. Contact terminals

Fig. 8. Contact terminals are constructed of ¾-in. dowel rod. Insulation on contact leads is stripped approximately ¾ in. back. Lead is then inserted allowing about 1/16 in. of copper strands to be bent over edge of hole. A 3/16 by ½-in. stove bolt screwed into the 3/16-in. hole makes a snug fit and good contact. This method of fastening leads to contact facilitates replacement of the contact leads when they break from continued use

quite another matter for him to find the requisite time for its construction. The board illustrated was planned and executed as a group project for eighth-grade boys who had completed their regular assignments. Close instructor supervision was necessary but the time involved was far less than if the instructor had constructed the device himself. In addition, through the utilization of a pupil group, an educational end is achieved during the construction of the board which further enhances the values which accrue from its use. The construction of an electrical quiz board is also an excellent project for students in teacher-training institutions. Prospective teachers are usually enthusiastic about a tangible piece of equipment which they can take with them upon graduation to their own teaching situation.

The accompanying drawings and illustrations suggest details of construction, layout, and dimensions. These, however, may be changed to suit the tastes of the individual instructor. The board described herewith has two banks of 18 card holders which accommodate inserts measuring 2¼ by 3¼ in. Each card holder in the left-hand bank is matched with one in the right-hand bank. When the contacts are touched to the terminals of two corresponding card holders the circuit is completed and the buzzer sounds. It is essential that the contacts be simple and sturdily constructed. The contact shown was adopted after several more elaborate designs failed. In the buzzer circuit, which is mounted on the back of the board, the use of a small bell-ringing transformer will eliminate the annoyance of changing dry cells. A buzzer is preferred to a bell because the noise therefrom is less objectionable. Those who would have complete silence might arrange a light in the circuit in place of the buzzer.

The procurement of a variety of sets of cards to suit individual needs and changing units can be done by the instructor or by a committee of pupils. Pictures of tools, hardware, types of doors, electrical equipment, and so forth can be cut from catalogs and magazines. When these are pasted to a good quality card they will serve for a long time. For

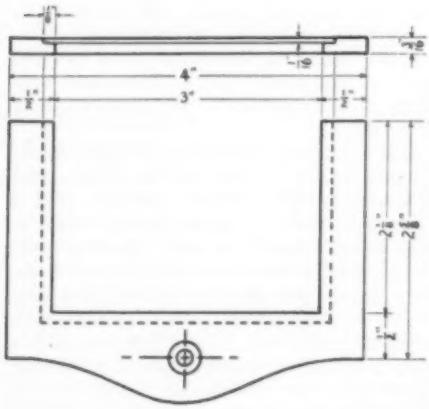
Fig. 10 (at left). This type card holder may be made of any light gauge metal. Card holders on the board illustrated were cut from tinplate obtained from tin cans. A coat of red lacquer improved their appearance.

Fig. 11 (at right). This card holder, made of 3/16-in. plywood, is more attractive than the metal type. A router was used to cut the rabbet which permits insertion of the card. Lacking a router an angle cut made with a sharp knife will also serve the purpose. Notice that the hole at base of contact is countersunk. This eliminates sharp bending of wire at that point

identification of woods small samples can be cut and glued to the cards. Amateur photographers and artists in the class can produce remarkably attractive inserts for the quiz board. The following list suggests only a few of the possibilities:

Tools — names, common use
Kinds of wood
Wood finishes
Mechanical drawing instruments — names, use
Mechanical drawing symbols
Kinds of abrasives
Fastenings — bolts, screws, nails
Hardware — latches, locks, hinges
Plumbing — pipe fittings, faucets, valves
Electrical equipment — kinds of wire, switches, outlets
Machines — names, use

To this list the ingenious instructor can add many more items. They may be geared in type and difficulty to suit the particular shop and age level of the pupils. Much incidental information can be taught through this medium which otherwise, for the lack of time, would have to go unmentioned.



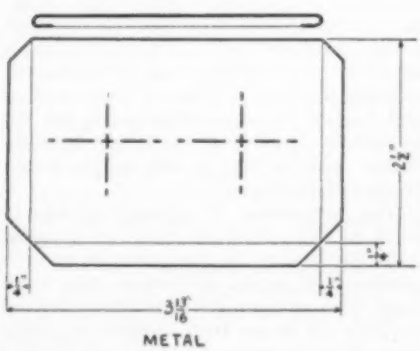


Fig. 12. Card holders for quiz board

METAL SPINNING WITH ALUMINUM

JAMES O. REYNOLDS
McKinley Occupational School
Dayton, Ohio

Metal spinning, that age old art so carefully controlled for many years, may now experience a new ring of enthusiasm with the relative abundance of aluminum available today. Copper, pewter, and brass have been the principal metals used in the school shop for spinning in years past. Their cost and scarcity, however, had discouraged the art of metal spinning recently, so low cost aluminum is a welcome member. Aluminum in the properly annealed condition probably is more desirable for beginning spinning than other metals.

In an up-to-date program of industrial arts, metal spinning is an integral phase of the general metals department. Commercially, spinning is on the increase. Locally, there have recently appeared in the "Help Wanted Ads" requests for metal spinners. That is something new! Aluminum fabrication is on the increase also, and the transfer of training involved as a result of working with it will be well worth while to any student.

The objectives for a unit in spinning may follow any standard formulation prescribed for an industrial-arts program.

Objectives

1. To develop an active interest in the current project
2. To create a taste for the artistic as well as the practical approach
3. To add to the student's consumer knowledge
4. To develop a respect for precision forming and fine final finishing
5. To develop their co-operativeness
6. To increase their feeling of confidence when confronted by a new situation
7. To eliminate much of the drabness of ordinary course work
8. To develop co-ordination

It will be interesting to follow through these objectives after establishing a unit of metal spinning.

Program

In our program at McKinley Occupational School we were fortunate to have secured, through the efforts of our industrial-arts supervisor, a large quantity of rejected aluminum blanks. These blanks were originally intended for ice cube refrigerator trays, so the quality for spinning was ideal. Many industries have surplus or rejected quantities of aluminum which they will sell for salvage at a nominal price. Some of it may be alloyed or in a heat-treated condition, but a call to their metallurgical department will usually result in obtaining the necessary technical information to process it into condition for spinning.

Equipment for the unit consists simply of ordinary wood turning lathes equipped with a free running tail stock center, metal spinning tools (standard sets may be purchased at a nominal price), and a quantity of hardwood blocks to be turned into desirable chuck forms.

Although some of the tools may be made in the various shops, it is well to purchase the

Spinning aluminum

more intricate ones as the use of the proper tool will insure a higher quality of workmanship.

Disks, in sizes ranging from 3- to 12-in. circles, are prepared in advance of starting the course to provide the correct size, and to eliminate promiscuous cutting of material on the spur of the moment.

As a preface for the unit, several days are used to introduce the subject to the students with help of a standard text on spinning and several publications by aluminum manufacturers.

During this introductory period, special emphasis is placed on safety and the precautions which the operator must observe. After several demonstrations during this time of introducing the correct safety policy, the responsibility lies with the operator. Much slippage of the disk may be eliminated by serrating or cross hatching the "follow" block.

Another vital point is to teach respect for the chuck. In most school shops hardwood chucks will be used, so to get the longest life possible from them and to retain the desired contour the students must not abuse them. Imperfect or damaged chucks are an aggravation and cannot produce good work. For a first course in spinning one piece chucks are sufficient. Untold designs may be produced on one piece chucks and by various methods of fabrication may be assembled into a variety of projects. Sectional chucks may well be included in a more advanced course, however.

Selection of the proper type of aluminum sheet is readily apparent; however, at this point it may be wise to explain the various qualities of other types of the metal. Explanation of cold working or alloying to vary the physical properties is a timely point.

During this classroom procedure, demonstrating the process is the most effective method of transferring the training from teacher to pupil. While watching, the student will observe the correct use of the tools and, more important, just how the entire body of the operator is used. This co-ordination will be most difficult for some to attain but constant practice will usually result in their being able to accomplish this motion.

While demonstrating the proper use of tools, specific use of each instrument, its capabilities and limitations should be thoroughly discussed. There will be a marked tendency to overuse the hardwood stick and such abuse will not result in professional work. After a few well-designed projects have been spun during the process of demonstration, the interest of the students will have reached a new high in intensity. At this point it is well to conclude with an excellent training film distributed by one of the large aluminum companies. This film will corroborate the instructor's training and demonstrating, and give the students an inside picture of commercial spinning.

Most shops will not have a sufficient number of lathes for the entire group, so it may be necessary to select a few boys, train them well and they in turn will be able to instruct those who follow them. This arrangement not only saves the instructor's time but also gives the student a sense of responsibility and confidence. Close supervision of the beginners will help to avoid many of the failures sometimes experienced. There are a few "don'ts" which must be impressed upon them. One of the commonest faults of students is to hurry too much. The training film will show that spinning is not an immediate process. Another is "overuse" of the stick as stated before. These and others may well be left to the instructor's judgment, however.

Finishing

As is common with all projects, an appropiate finish serves to increase the final satisfaction of the craft worker. Aluminum will respond to a variety of finishing methods, some of which are simple and easily applied while others are more complex and more difficult to obtain. Again the aluminum companies provide a pamphlet on finishing. The high polish finish is a good first finish, as it tends to reveal any imperfections resulting from improper procedure which will serve as a lesson in itself. A project well done and properly finished will draw praise from the outside and this is probably one of the greatest motivating factors of a student's work.

Many students will complete a fine variety of spun objects. Keep an occasional well-executed piece for a permanent exhibit to show visitors as well as to encourage competition between students for good work. Ideas of various individuals may be preserved in this manner while at the same time it is good advertising.

Conclusion

With a well-organized unit of metal spinning developed, the objectives as listed previously will have been met. Aluminum has been chosen as the most satisfactory medium for beginners since spinning is a craft involving considerable skill. Working first with less flexible materials may result in wasted material, poor quality of work, or other aggravations. Above all else that quality of enthusiasm in youngsters must be preserved.

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Institutional on-farm training, under the G.I. Bill and Public Law 16 reached an all-time peak on May 1, 1950, with 354,706 veterans in training. The program combines classroom instruction with actual training on the farm.

INDIAN SILVERSMITHING

BEN HUNT
Hales Corners, Wis.

(Continued from page 126 of the March, 1950, issue)

Wrist-Watch Bands

The idea of a clamp-on watch band may not appeal to most people at first, but after having worn one once, few will want to go back to any of the other kinds.

When making one of these watch bands, be sure the band fits the wrist comfortably before soldering the brackets in place. Merely soldering brackets to a bracelet will not do. The bracelet must fit snugly. If the bracket grip is too light, or if the silver in the band is not heavy enough, the bracelet will break in time because of the slight bending of the metal when putting it on or removing it day after day.

Use 14-ga. silver and make the width of the band so the winding stem projects for easy winding and setting. If a 6-in. blank makes a band that is too long, cut off some at the ends.

The Indian-made watch bands are shown with two pieces of silver soldered on and projecting as shown in the lower right-hand portion of Plate 44. These two pieces of thin silver are then bent and fitted to the watch, which is at best a makeshift affair. At *A* and *B*, Plate 44, are shown two types of brackets that are soldered in the correct position.

Bracket *A* is made of 14-ga. silver. It consists of a U-shaped piece with another piece of 14-ga. silver soldered inside. Ream or drill out the opening to fit the spring pin in the watch. The sketch showing bracket *B* is self-explanatory. It also should be made of 14-ga. silver. It is bent around a nail the size of the spring pin of the watch and later reamed to fit. When the brackets are made, attach them to the watch and find their exact position on the band. Then stamp the band. This procedure is not necessary on the upper band, shown on Plate 44, because the ornament does not conflict with the brackets or the settings. After stamping, buff and polish the band and then bend it to fit the wrist. Next place a ***thin*** piece of cardboard on the band under the watch and file the brackets so that they fit properly. The long brackets will have to be curved to fit the band. The watch should fit without having to bend the band to insert the pins. Mark the exact position of each bracket with a fine scriber. Remove the brackets from the watch and wire them in place for soldering. Brackets *B* and *B* can be soldered at the same time, but in the case of the other band, proceed as shown in Figure 3. Wire the bezels and the bracket on one side and solder it in the position shown. Then clean up the other side and do likewise. Prop up the bracelet with pieces of charcoal when soldering.

There are, of course, many types of bracelets that can be used for wrist-watch bands. The two bands shown were chosen more for showing the method of construction rather than for beauty of design. Bear in mind not to have

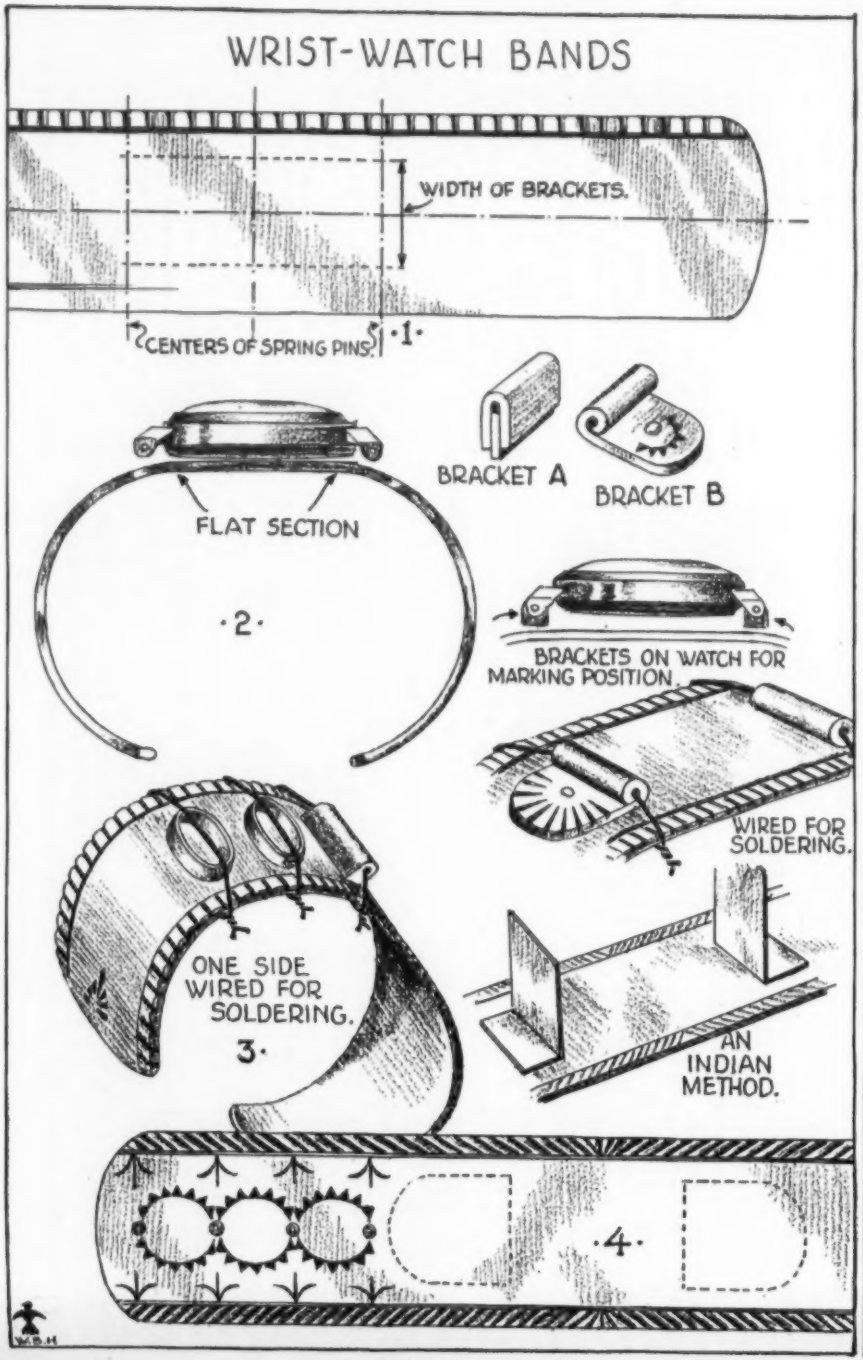


Plate 44

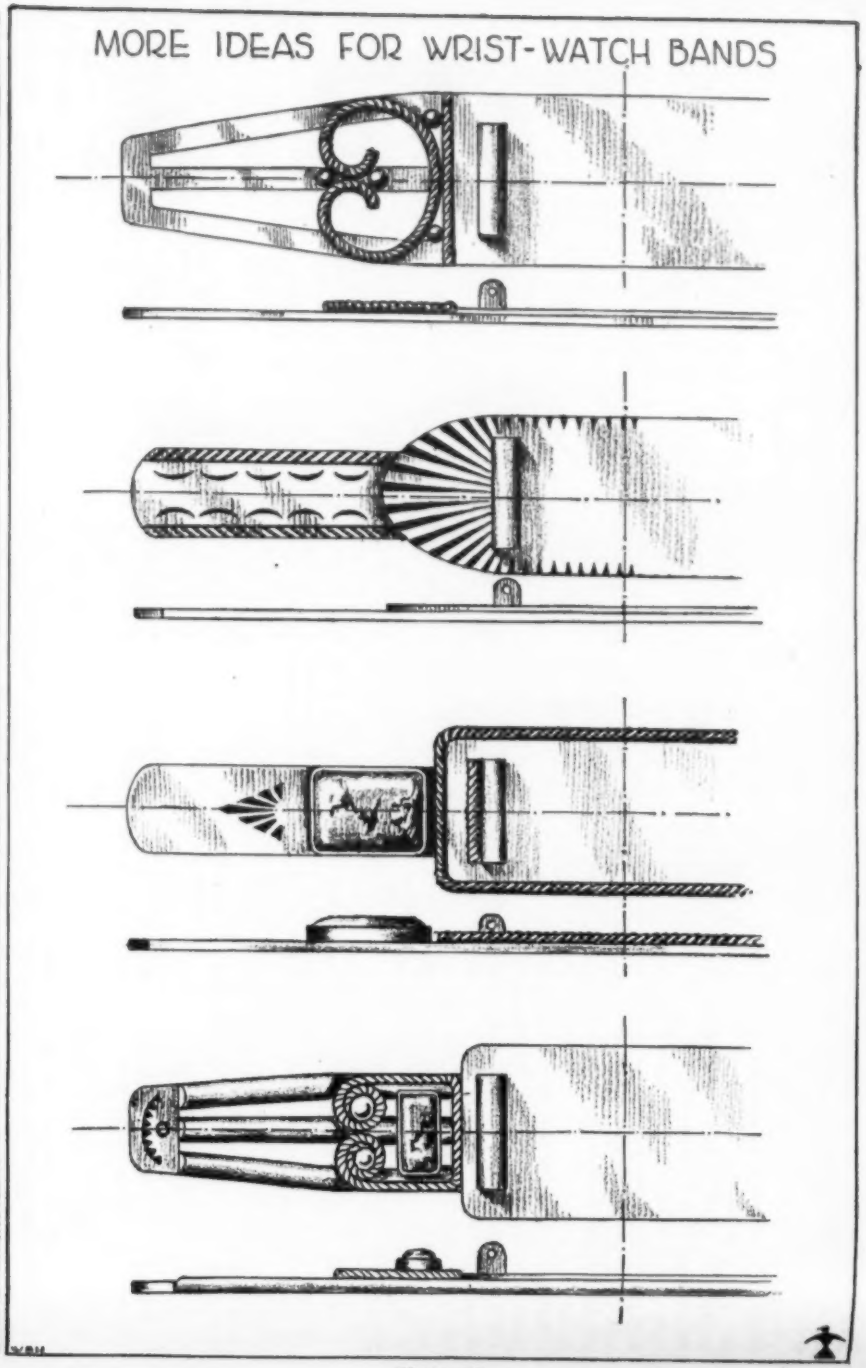
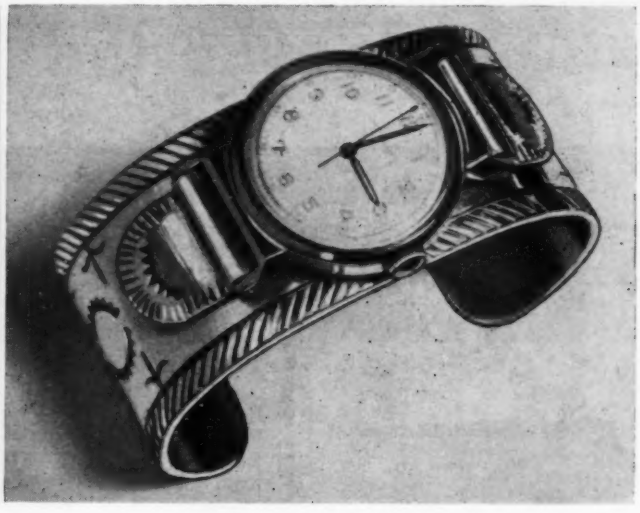


Plate 45

Silver and spider web turquoise watch band



Aluminum watch band

the watch setting too high. Keep it as low as possible, and do not make the band of silver too light or the constant bending may eventually cause it to crystallize and break. Remember also that to be consistent, one must not place a gold watch on a silver band.

DOUGLAS FIR

Douglas Fir of the Western Pine region is found in nearly every sector of the vast, 12-state area. Today's total Douglas Fir saw-timber stand in the region is estimated at 101.5 billion board feet. Annual lumber production averages approximately one billion feet.

In the Pine region, Douglas Fir trees are found at elevations of 1500 to 7000 feet and grow to maximum diameters of seven feet and heights of 200 feet.

The wood of Douglas Fir is straight-grained, moderately heavy and normally dense. Although classed as resinous, the amount of resin is limited. The sapwood ring is almost pure white and very narrow. Heartwood is orange-red and the color contrast between springwood and summerwood is quite distinct.

In lumber form, Douglas Fir weighs 31 pounds per cubic foot and has a specific gravity of .44 at 12 per cent moisture content. Pound for pound, Douglas Fir is one of the strongest of the softwoods. Its load bearing capacity equals many mild steels and, of course, it is considerably lighter in weight, fitting it for many structural purposes in heavy construction.

A moderately heavy wood, Douglas Fir will shrink more in drying than most woods of lighter weight. Volumetric shrinkage when dried from a green state to 12–15 per cent moisture content is 5.4 per cent, compared to the softwood range of 3.4–6.6 per cent.

Douglas Fir ranks approximately midway among all commercial softwoods in nail-holding ability. Safe resistance to withdrawal of eight-penny nails driven perpendicular to the grain into seasoned stock is 28 pounds per lineal inch; resistance in other softwoods ranges from 17 to 39 pounds.

The wood works readily with machine tools and, if tools are in good condition, easily by hand. For a successful, lasting paint finish on Douglas Fir, it should have a moisture content from 12 to 15 per cent, or as close to the prevailing humidity as possible. Care should be exercised in selection of a priming coat. White lead or aluminum paint is recommended.

Douglas Fir sapwood can be treated with preservatives very readily. Heartwood, due to its density, does not easily absorb preservatives but depth of penetration secured is sufficient for most practical purposes.

Douglas Fir of the Western Pine region has an exceptionally long use life even under conditions favoring decay; heartwood is rated in the upper brackets by the Forest Products Laboratory for durability under decay-fostering conditions. In glueability it is rated in Group 2, next to the top.

Combining raw strength with delightful grain configuration, Douglas Fir can be used for the heaviest of structural work to fine finish purposes and for the many utility uses in between. But it's in the heavy construction field that it stands supreme. For warehouse and factory trussed roofs, for bridges and trestles, for beams, posts, studs, stringers, joists, rafters, and decking and for the many miscellaneous railroad uses, Douglas Fir of the Western Pine region is one of the nation's top wood species.

For residential construction, Douglas Fir is applied as framing, sheathing, siding and for interior trim, cabinetwork and paneling. It is a popular wood for farm use where toughness and strength are primary requirements. The same properties lead to its widespread utilization for industrial purposes and crating.

The foregoing was taken from a release by the information service of the Western Pine Assn., 510 Yeon Bldg., Portland 4, Ore.

TAP WRENCH

W. A. STAKEM and G. A. HUMMEL
Allegany Trade School
Cumberland, Md.

This type of tap wrench will assure a straight tapped hole if work is left stationary and tap placed in chuck after using the tap drill.

It is designed to fit a Jacobs key type chuck No. 6. Size could be altered to fit other requirements.

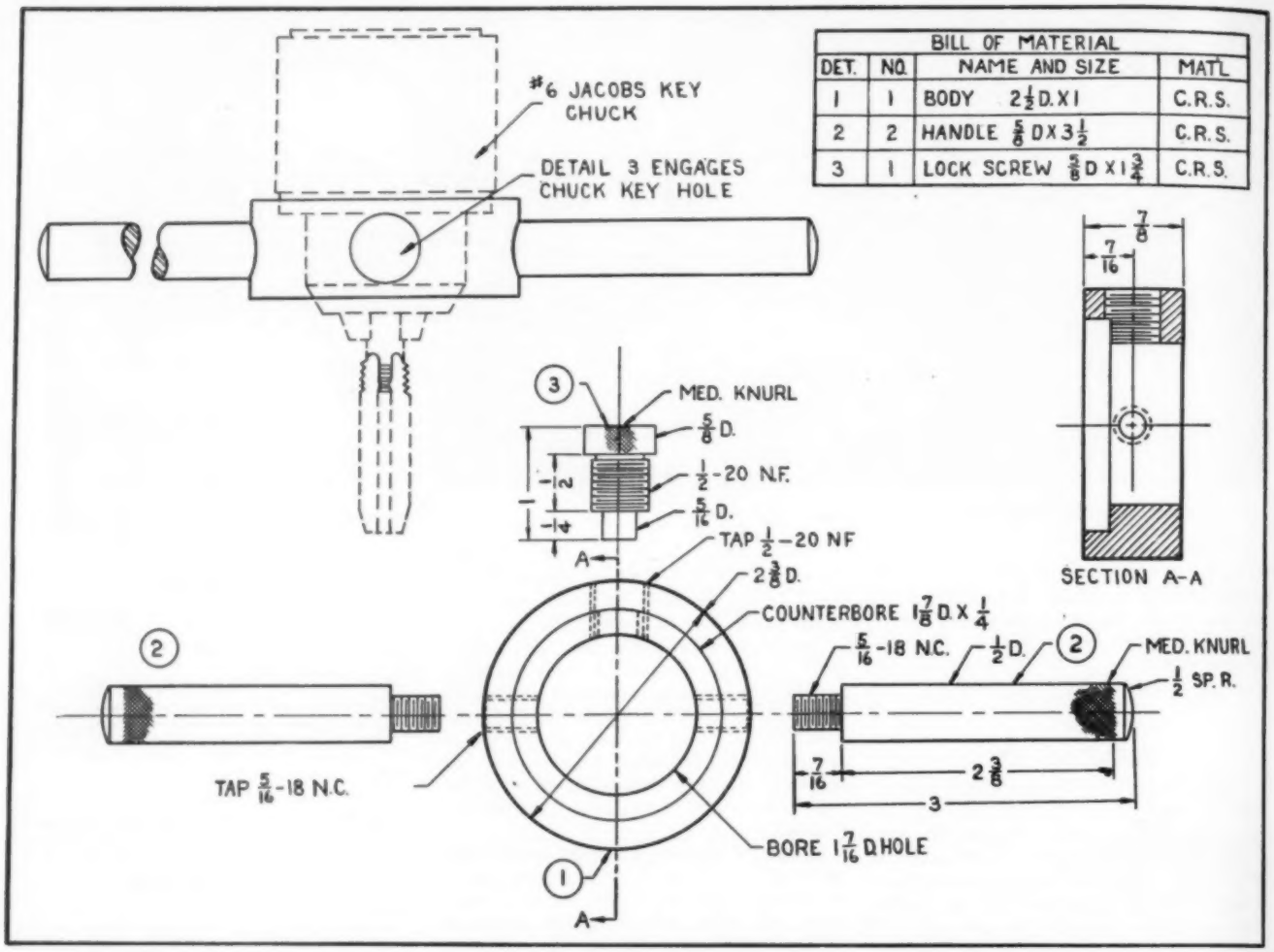
Operating Steps

Body

1. Place stock for body in 3-jaw chuck. Face center drill, then drill to 1¼-in. diameter, and then bore to 1 7/16 in. through piece.
2. Bore to 1⅞-in. diameter, ¼ in. deep. Break sharp corners. Check for fit on drill chuck if possible.
3. Turn work and chuck on inside of large hole. Face to ⅞ in. long, and turn to 2⅜ in. outside diameter.
4. Lay out for tapped holes.
5. Drill and tap for ½ — 20 NF bolt.
6. Drill and tap for 5/16 — 18 NC bolt.
7. Countersink 5/16 — 18 holes with ½ drill so handle will seat properly.

Handles

1. Place stock in 3-jaw chuck long enough for turning out one handle. Allow for knurling tool not being able to get all the way up to chuck.
2. Face, center drill, and use center in tailstock to support work.
3. Turn to ½ in. outside diameter and knurl.
4. Turn to 5/16 — .005 in. the required length, chamfer, and chase threads. Check fit of threads to hole in body.
5. Reverse stock in chuck and repeat operation on other end.
6. Saw off excess stock and face ends of handles as required. Protect finished knurl with pieces of copper.


BILL OF MATERIAL
DET. | NO. | NAME AND SIZE | MATL
1 | 1 | BODY 2½ D. X I | C.R.S.
2 | 2 | HANDLE ⅝ D X 3½ | C.R.S.
3 | 1 | LOCK SCREW ⅝ D X 1¾ | C.R.S.
#6 JACOBS KEY CHUCK
DETAIL 3 ENGAGES CHUCK KEY HOLE
MED. KNURL
⅝ D.
½-20 N.F.
⅝ D.
TAP ½-20 NF
2⅜ D.
COUNTERBORE 1⅞ D. X ¼
TAP ⅝-18 N.C.
⅝-18 N.C.
½ D.
MED. KNURL
½ SP. R.
BORE 1 7/16 D. HOLE
SECTION A-A

Tap wrench — drill-press type

Lock Screw

1. Place short piece of stock in 3-jaw chuck.
2. Face, center drill.
3. Using center for support, take cut to true stock and knurl.
4. Turn to ½ — .005 in., and then to 5/16 in. for the required length. Undercut.
5. Chase 20 threads on ½-in. outside diameter end. Check fit of threads to hole in body.
6. Saw off excess stock and face end to length.
7. Assemble wrench and check for fit.

CONTESTS

(Continued from page 313)

nouncer gave tickets each week for football games to those who predicted the score of certain announced games. Most of the students were interested in the fortunes of the local college team. Discussion centered around the merits of certain players, the opposing team, the chances of each and so on. Newspapers were brought to class and various ones scanned to see what was written about the teams. One boy brought in the local newspaper of the opposing team and gave the other town's viewpoint. Many who had never contributed a great deal to oral discussion got into the act when their interest was aroused by something that they had some knowledge of, and could talk about.

History and English can be co-ordinated in sending in entries of the biographical nature — the style of "Who Am I?" Historical characters can be written up by individual members of the class. Each student may take his turn reading sentence by sentence a biographical sketch, stopping as each clue is given, until someone guesses who the character is. When finished as a class unit then the written biographies can be submitted to the particular radio station or company that sponsors that type of contest.

As most contests require box tops and labels it may make it difficult in a way to enter the contest. Make it clear to the child that he is not required to buy the product. If he has that particular product at home he may bring in the label, if not, then he has at least had a worth-while experience. The cost to the child is nothing more than a three cent stamp, small enough in the development of a worth-while unit.

Recently there was a contest regarding "Best Teacher" — something right over our own home plate. How many of us took a swing at that pitch?

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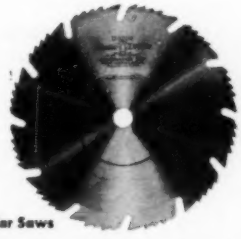
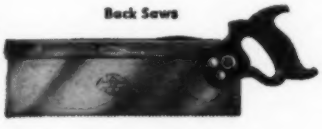


DeLuxe Circular Saws

Hand Saws



Back Saws

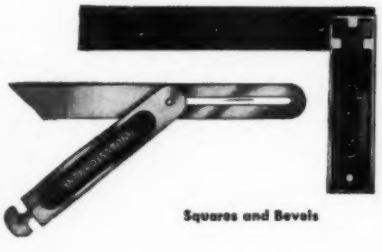
Band Saws

Compass Saws

Dovetail Saws

Files and Rasps

Coping Saws



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MODERN FLOWER CONTAINER

DELBERT A. DYKE
Assoc. Prof. of Industrial Arts
Middle Tennessee State College
Murfreesboro, Tenn.

The need for something a little different in a flower container is always present. A container suitable for dry foliage, the heavier colored flowers such as dwarf varieties of marigolds, zinnias, and chrysanthemums, plus arrangements of winter foliage is described in this article.

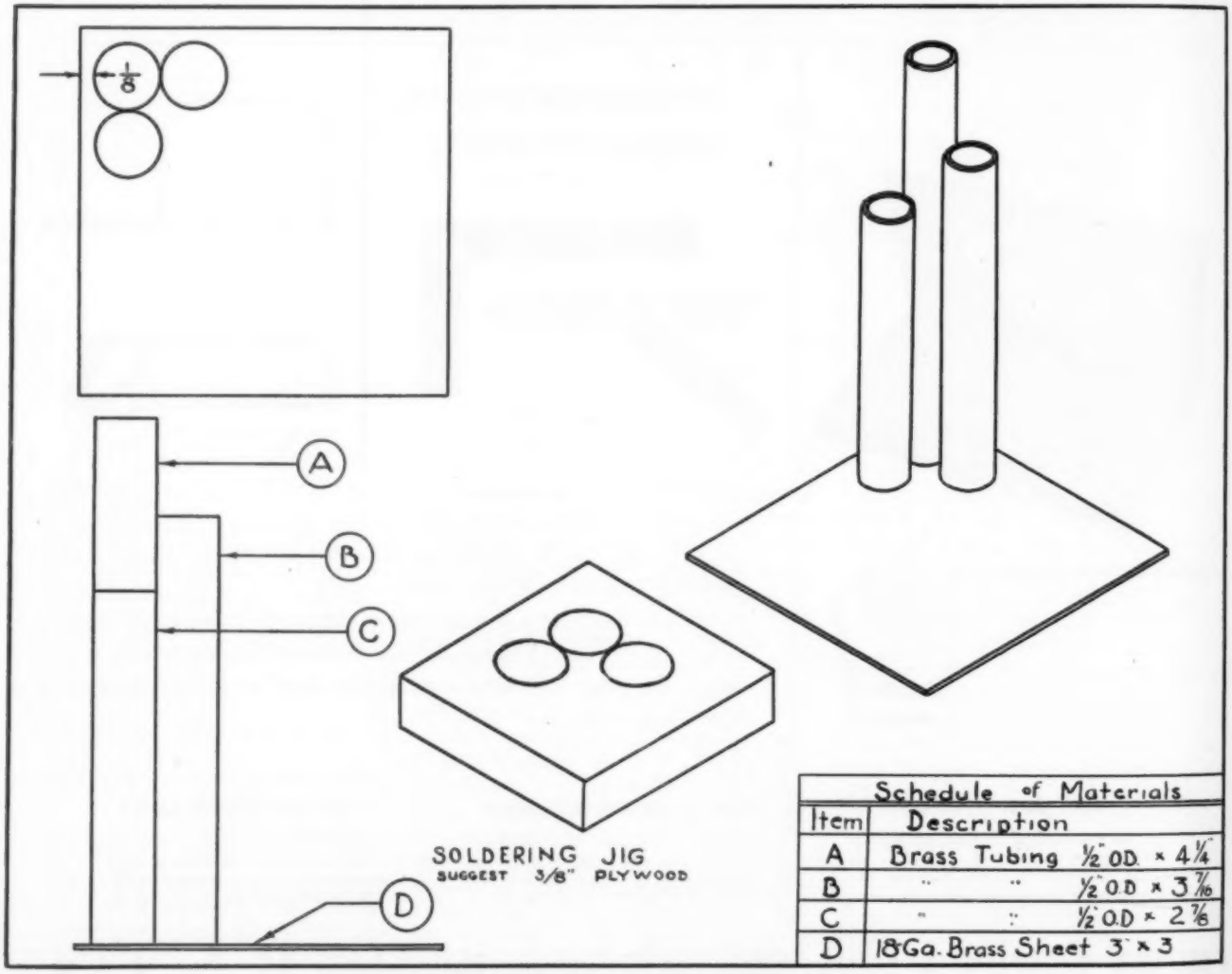
Procedure:

1. Select the material for the base and cut to size.
2. Drawfile edges, polish with fine abrasive cloth.
3. Remove any dents or blemishes in top surface of base with fine abrasive cloth.
4. Polish edges and top of base surface with tripoli compound and buffing wheel.

Modern flower container

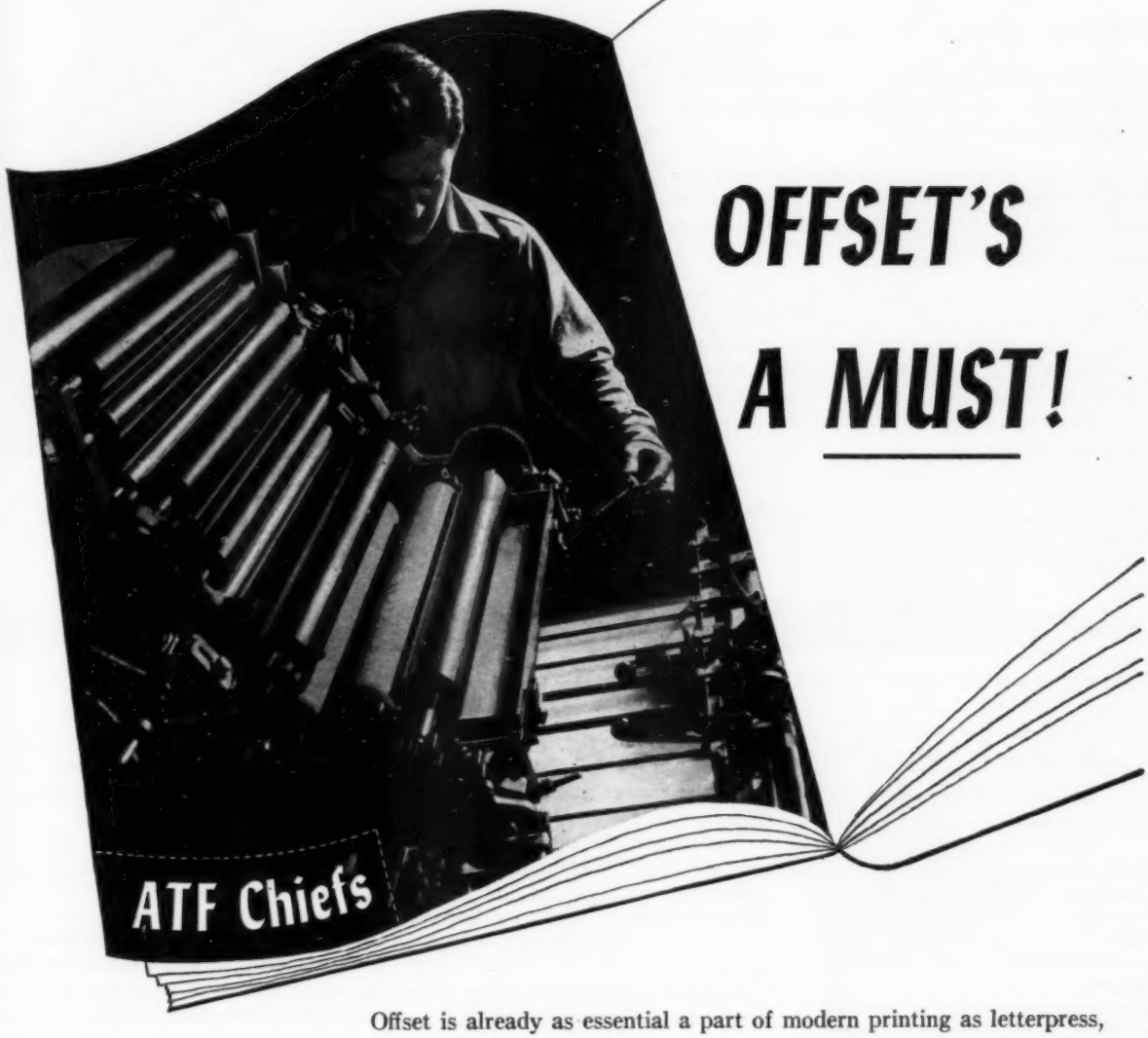
5. Cut tubing to length using 32 point hack saw.
6. Square ends by filing, or use a disk sander if available.
7. Polish tubes with tripoli on buffing wheel.
8. Clean base and tubing in preparation for soldering.
9. Place tubing in soldering jig and apply a small amount of paste solder with flux added to the interior surface of each tube, or apply a small amount of paste flux if other is not available and drop a small globule of solder in each tube when placed on base.
10. Place tubing on base and apply sufficient heat to sweat solder tubing members to base. (Soldering furnace, alcohol torch, mouth blowpipe, or No. 3/0 oxyacetylene torch will work equally well for this operation.)
11. Remove heat source and allow to cool some, then place in pickling solution to remove any oxide or foreign material caused by the soldering operation.
12. Rinse well in running water.

(Continued on page 24A)



Schedule of Materials	
Item	Description
A	Brass Tubing ½" OD × 4¼"
B	" " ½" OD × 3 7/16"
C	" " ½" OD × 2 7/16"
D	18 Ga. Brass Sheet 3" × 3"

Details of modern flower container

In TODAY'S *Graphic Arts Instruction*

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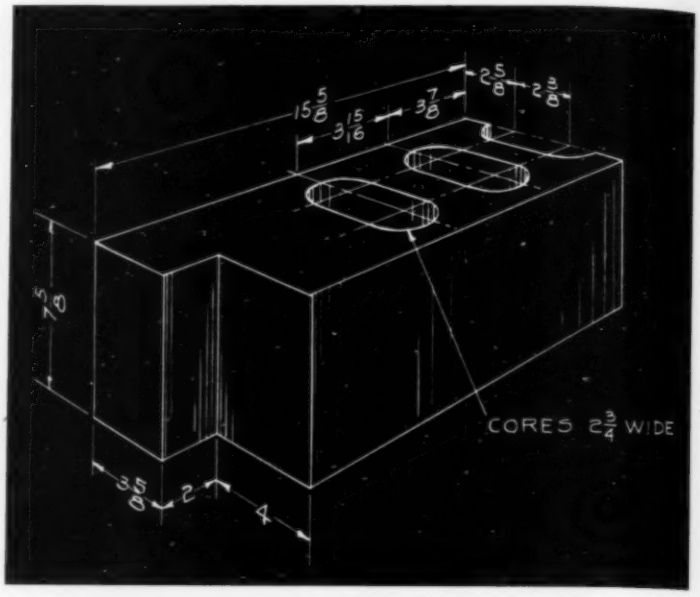

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MODERN FLOWER CONTAINER

(Continued from page 22A)

13. Scrub thoroughly with fine pumice powder and water handling the metal no more than necessary.

14. Apply a coat of furniture wax and polish, or finish natural by spraying with clear metal lacquer.

15. When dry, paint bottom of base with a good quality of enamel to match the color of flock desired, then spray with flock to give the bottom a feltlike appearance.

PLASTICS AS A VISUAL TRAINING AID

W. V. G. HOGER
Instructor of Auto Mechanics
Phoenix Union High School
Phoenix, Ariz.

The adoption and use of valuable visual training aids developed during the war for the use of the armed forces are apparently being overlooked by many teachers.

The Army Ordnance School, Aberdeen Proving Ground, Md., pioneered in the adaptation of plastics to military training aids. Aside from the plastic technicians' courses to provide instructors to teach hospitalized men to make such useful articles as picture frames, notebook covers, letter openers, and the like, the use of plastics in construction of transparent plastic models permitting direct observation of the inside working parts of the most complicated pieces of machinery, represented an important development in visual training aids.

Among the items employed in what has been called the "see-how-it-works" method of teaching were a plastic covered carburetor, transparent plastic models of the cooling system of an automobile engine, carburetor air cleaner, hydrovac brake system, machine guns and rockets.[1]

This system of providing visual proof of tedious theory decreased classroom time, since it supplied the student with the actual mechanical action as it was described by the instructor. Instead of trying to imagine how the float valve controlled the fuel coming into the carburetor, and its subsequent route through the carburetor by means of pictures and diagrams, the actual operation could be witnessed from beginning to end through a working plastic model of the carburetor itself.

To produce these visual aids within the school is entirely possible, as tests have proved, and should result in enrichment of subject matter for all courses taking part in the production. Close co-operation between the plastics course, machineshop course, and the mechanics and engineering courses making use of the plastic models would be necessary.

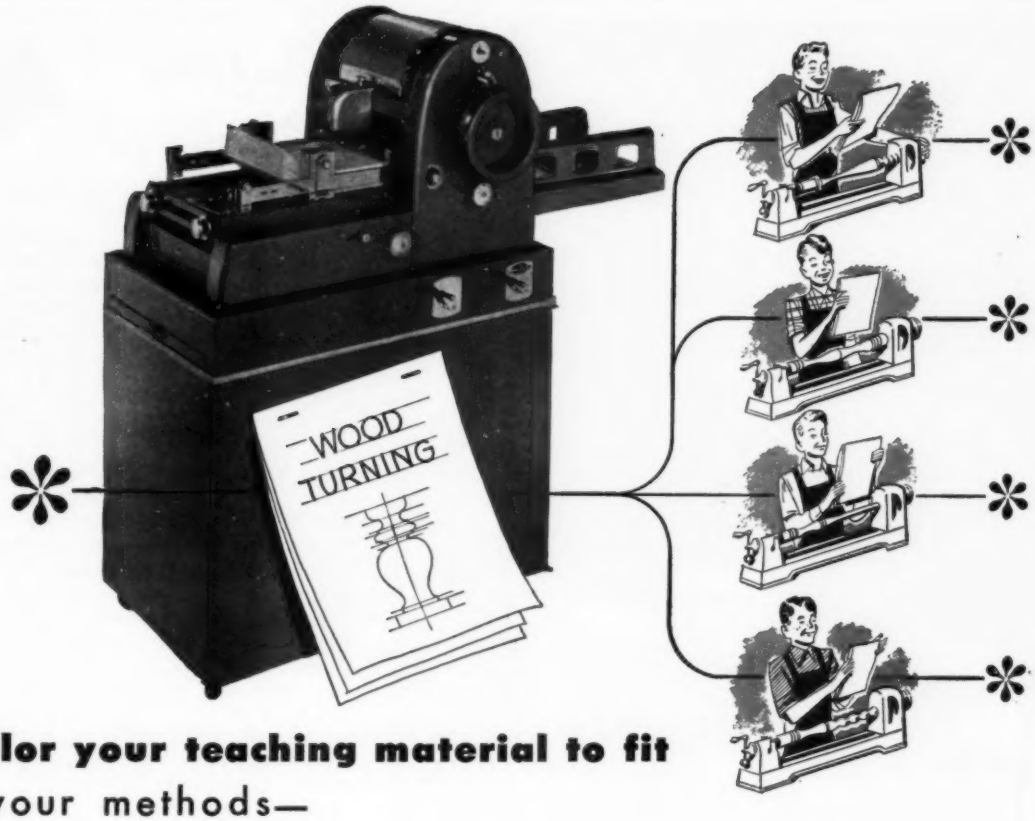
[1]See references at end of article for all footnotes.

Type of Plastics Used

Of the various plastics available, the acrylics have been found to be the most suitable for making plastic working models. Their transparency is their outstanding feature, but the ease of machining and facility with which they can be brought to close tolerance in manufacture permits even the use of metal parts as inserts in the models.[2] This plastic, technically called methyl methacrylate, becomes as pliable as rubber at a temperature between 200 and 250 F., making it easy to shape or bend the material into any desired form. It can be molded by hand, threaded or machined, and none of the shavings or scrap pieces need be wasted. These may be dissolved in methylene dichloride to make a transparent cement with which the sections of the model may be joined without obstructing the view in any way.[1]

Since acrylics do not have the strength of metal alloys, engineers found it was

(Continued on page 27A)



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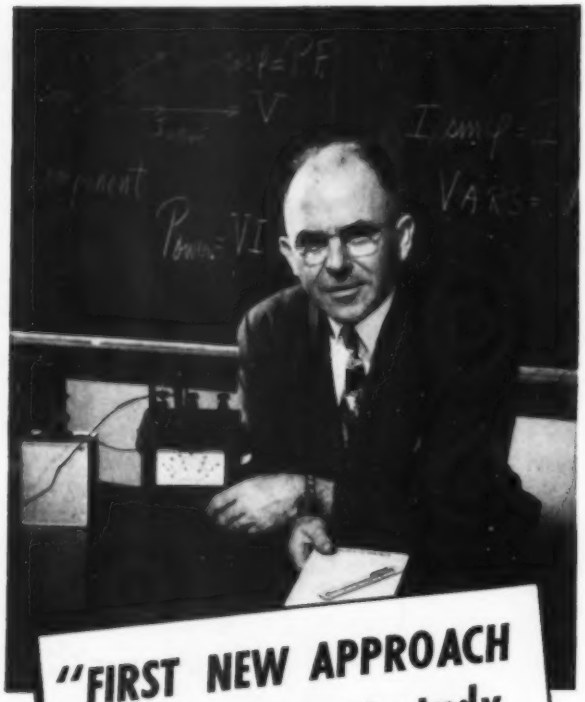

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PLASTIC VISUAL TRAINING AIDS

(Continued from page 24A)

necessary in making transparent plastic models to have them operate at a safe pressure of 300 lb. per sq. in., and specified a safety factor of 2. Even at this pressure, walls of various housings could not be made as thin as when made of metal. Housings of plastic were made of varying thicknesses according to the wear and use to which they would be subjected in operation or demonstration. Tolerances were more lenient in plastics than in metal since a lower pressure was used, and the coefficients of expansion or metal and acrylics were different.[4]

In these working plastic models of visual training aids, all springs had to be redesigned and reduced in compression strength to permit the units to function under the lower pressure.

Engineers have spent a great deal of time studying the subject of mechanical stress analysis with accurately made plastic models. The transparent parts were tested while being observed under polarized light, making the lines of stress plainly visible in the plastic. Deflection tests were also conducted on very accurate models, and in these tests plastics worked faster than metal, were more accurate than wood, and when formed into bars, it was possible to compute the modulus of deflection.[5]

Experiments With Various Kinds of Plastics

Experimentation with cellulose acetate, a plastic similar in appearance which is more easily worked than the acrylics, proved not as stable or strong, and although suitable for some items, was not satisfactory in the making of working models.

The most difficult step in the process of producing a working plastic model in school appears to be in the making of the mold. Conventional diemaking methods are too expensive for use in production of school training aids, and the work does not warrant the expense of elaborate equipment. In trying to make use of materials on hand, it was found that the intricate shape of the castings, and the pressures required to clarify the plastic mix, made it impossible to use plaster molds. Subsequent tests, making use of lead molds, resulted in defective castings, and distortion of the molds. The one important result of these tests was to show that the greater the pressure, the better the finished product. Zinc alloys, although their high melting point made them more difficult to use than plaster or lead, were found to reproduce the pattern successfully, and to withstand the molding pressures.

Making the Mold

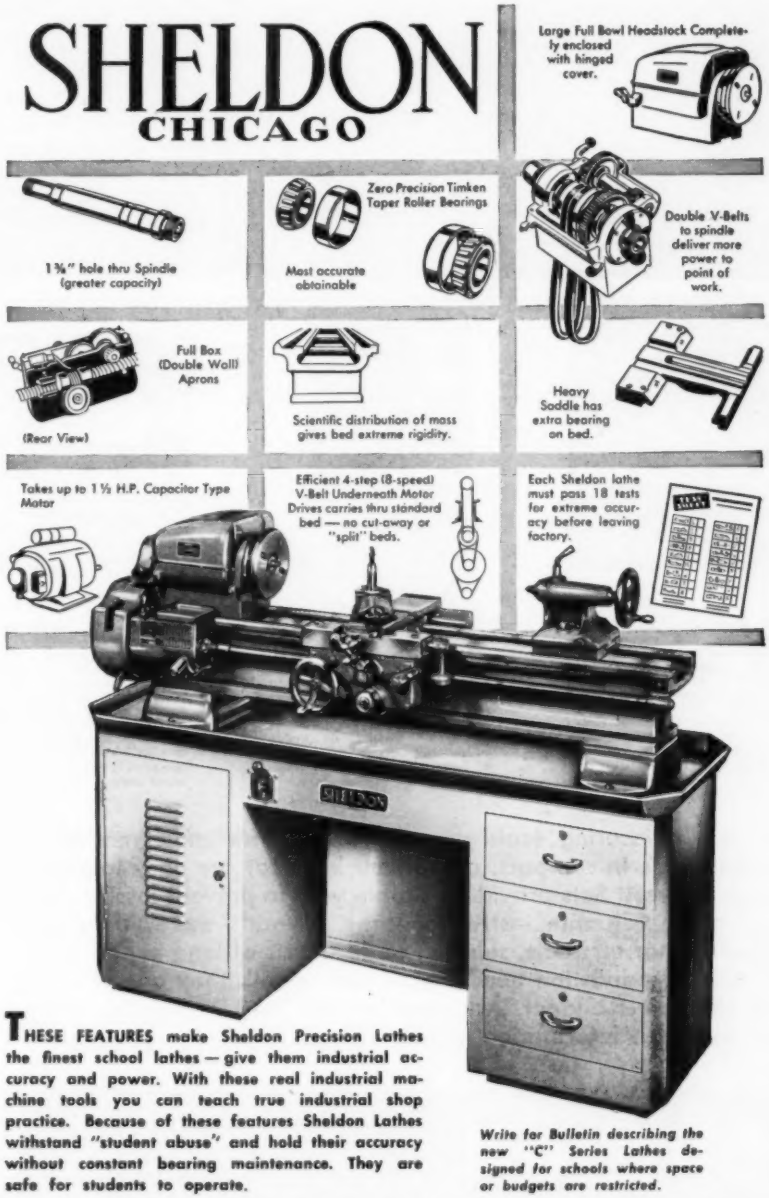
Once the mold is ready, the plastic mixture must be introduced into the mold in such a way as to eliminate all air from the material. The pressure used in experiments varied from 1000 to 2000 lb. per sq. in., depending on the intricacy of the molded part.[5] The temperature and time for curing the plastic in the mold depended upon the pressure applied. Under these conditions the number of rejected models from the process was small, and when the mold was well polished, the product had a high luster without further buffing.

Machining Plastics

It was found in machining housings of plastics that the cutting tool tended to absorb heat, and hence, to score the plastic. A slower cutting speed than that used for metal, combined with a liquid coolant composed of soap and water was found to solve this problem. Small scratches had to be polished out by using a fine emory cloth, after which the finishing had to be completed with optical rouge and a buffer. All

(Continued on next page)

SHELDON
CHICAGO


Large Full Bowl Headstock Completely enclosed with hinged cover.
1 ¾" hole thru Spindle (greater capacity)
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Most accurate obtainable
Double V-Belts to spindle deliver more power to point of work.
Full Box (Double Wall) Aprons
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Scientific distribution of mass gives bed extreme rigidity.
Heavy Saddle has extra bearing on bed.
Takes up to 1 ½ H.P. Capacitor Type Motor
Efficient 4-step (8-speed) V-Belt Underneath Motor Drives carries thru standard bed — no cut-away or "split" beds.
Each Sheldon lathe must pass 18 tests for extreme accuracy before leaving factory.
SHELDON

THESE FEATURES make Sheldon Precision Lathes the finest school lathes — give them industrial accuracy and power. With these real industrial machine tools you can teach true industrial shop practice. Because of these features Sheldon Lathes withstand "student abuse" and hold their accuracy without constant bearing maintenance. They are safe for students to operate.

Write for Bulletin describing the new "C" Series Lathes designed for schools where space or budgets are restricted.

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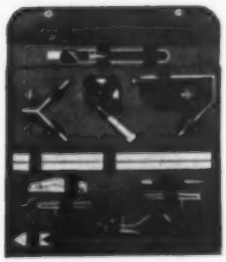
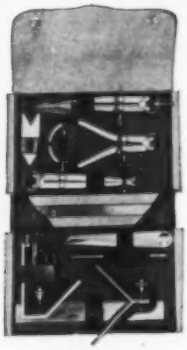


SET NO. 902B
A more complete set for students and apprentices. Contains a 1" micrometer, 12" combination square with center head, center gage, center punch, 6" flexible steel rule in case, 4" divider, 4" inside caliper, 4" outside caliper and 4" hermaphrodite caliper. Simulated leather folding case.



SET NO. 900
The basic tools at minimum cost. Contains 6" combination square complete, 6" flexible steel rule, center gage, center punch, 4" divider, 4" inside caliper, 4" outside caliper and 4" hermaphrodite caliper. Simulated leather folding case.

SET NO. 901
A practical, economical "package" — contains 6" combination square complete, 6" flexible steel rule in leather case, center gage, center punch, 5" divider, 6" outside caliper and 6" inside caliper plus The Starrett Book for Student Machinists — all in a sturdy, compact, nicely finished wood case.

All the measuring tools your boys need for most modern shop projects . . . in compact, convenient kits that are easy to store and issue. Starrett Sets provide a simple way to prevent loss or damage and save valuable instruction time. What's more, they contain genuine Starrett Tools, selected on the basis of long experience with vocational education needs. And best of all, they are priced to fit the slenderest budget. Ask your Starrett Tool Distributor — or write for complete information. Address Dept. "CE."

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PLASTIC VISUAL TRAINING AIDS

(Continued from previous page)

edges had to be smoothed to prevent chipping or cracking.[4]

When a piece to be machined is too large, or of a shape which does not lend itself readily to machining, it may be made in smaller pieces, which may then be cemented together with ethylene dichloride solution to form a smooth and clear finished product.

The experiments carried on in an effort to produce economical and practical plastic working models have been highly successful, and the problems of incorporating this new and valuable visual training aid into the training program of the progressive school now lies squarely with the teacher.

LITERATURE REFERENCES

1. "Plastic Training Aids," *Mechanical Engineering* 68:253 (Mar., 1946).
2. "Outside Looking In," *Modern Plastics* 21:96 (July, 1944).
3. "Transparent Models," by A. A. Jennings, *Modern Plastics* 23:130 (June, 1946).
4. "Transparent Training Aids," by R. H. Holmes, *Modern Plastics* 22:113 (Jan., 1945).
5. "Zinc Alloy Molds for Short Runs," *Modern Plastics* 23:150 (Aug., 1946).

Questions and Answers

ARTICLES ON SHOP ACCOUNTING

1144. *Q.:* I wonder if you could give me a list of articles on accounting and bookkeeping that we can refer to. — *R. L. B.*

A.: The following list of articles on accounting and bookkeeping have been published in INDUSTRIAL ARTS AND VOCATIONAL EDUCATION:

1928, November, p. 390 — "Accounting System for School Shops"
1940, May, p. 180 — "Simplified Supply Cost-and-Record System"
1941, January, p. 5 — "Material Control and Distribution"
1941, June, p. 236 — "Industrial-Arts Shop Inventory"
1942, April, p. 181 — "A Perpetual Inventory of the Paper Stock"
1943, April, p. 177 — "Inventory Sheet"
1944, May, p. 206 — "Supply Requisition and Inventory Sheet"
1947, September, p. 305 — "Method of Determining Shop Supply Needs"
1948, September, p. 269 — "Shop Bookkeeping System"

— *J. J. M.*

Personal News

ANOTHER LEADER DIES

Many citizens of Cleveland, and numerous educators interested in industrial arts and vocational education will be very sorry to hear the sad news that William Elmer Roberts has passed away.

Especially will this be true of the many teachers and students who knew Mr. Roberts personally, and fell under the spell of his genial character.

He was born in Cambridge, Mass., July 21, 1866. Later his family moved to Watertown, Mass. Because of ill health, he obtained most of his elementary and high school education under the guidance of his mother who had been a school teacher in her earlier life.

William E. Roberts

At the age of 14, he went to work for a cabinetmaker and continued at this trade for seven years. While learning the cabinetmaker's trade he attended evening school at Boston to learn drafting. This enabled him to take a job as draftsman

(Continued on page 30A)

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BOICE-CRANE Series No. 2600 HELMET HEAD DRILL PRESSES

DURABLE
SENSITIVE
ACCURATE

— Yet Low Priced!

Drills up to ⅝" in cast iron, not just the ½" of ordinary drill presses. 50% thicker column wall and extra precision, too, wherever precision counts.

Larger and longer quills for the spindle — to take heavier thrust loads and to do more accurate deep-hole drilling. Heavy box-type head has 33% to 50% more bearing for the quill, so 4" or more of the quill is always supported. That feature alone makes them first-class hollow-chisel mortisers (with an inexpensive attachment), for they stand up years longer at the point where lighter presses wear excessively.

A better 6-tooth spline drive — involute shaped spline teeth and all long-wearing steel instead of die-cast. Heavier-walled column, 3/16" thick, gives greater rigidity and closer tolerance at the chuck on heaviest thrust. Balanced for higer spindle speeds.

A full line of wood-working accessories for routing, mortising, etc., available.

Sold through industrial supply distributors in most cities.

SPECIFICATIONS:

Capacity: 13"; Maximum ⅝" Drill, ½" Tap, ½" x ½" Hollow Chisel.
Spindle Feed: 4".
Speeds:
Hi-speed Models — 500, 925, 1750, 3250, 5500.
Slo-speed Models — 425, 775, 1330, 2200, 3340.
Bearings: 4 New Departure Ball. Grease-sealed.
Spindle: ⅝" dia. 6-tooth involute type spline.
Tables: Standard — size 10" x 11"; tilts 45°.
Production — work surface 11" x 16".
Clearance Table to Chuck: Bench — 17½"; floor — 39½".
Height Overall: Bench — 42"; floor — 71".

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☐ New 44-page Catalog No. 50 on entire line of intermediate capacity power tools.

NAME.....
SCHOOL.....
STREET.....
CITY & STATE.....

PERSONAL NEWS

(Continued from page 28A)

in 1887 at an ironworks in Cambridge, Mass.

In September of 1887 he was appointed instructor in the School of Mechanic Arts that had been organized by Dr. John D. Runkle.

From 1888 to 1890 he attended the Massachusetts Institute of Technology, and in September, 1890, the board of education in Cleveland, Ohio, appointed him principal of the West Manual Training School in that city.

In 1893 he was given charge of all manual training in the Cleveland schools, and immediately started introducing instruction in handwork into the lower, intermediate, and higher grades, and into and through the four years of high school. He was always a stickler for good design and worked out a close co-ordination between the art and industrial-arts departments of Cleveland.

Mr. Roberts was very active at all times to upgrade his teachers by word and example. His boundless energy also was felt beyond his own city and his work in the various educational associations, is ample evidence of the interest which he had in all phases of industrial education.

His efforts and influence in 1933 caused the American Vocational Association to amend its constitution so as to create the new office of vice-president for industrial arts.

His literary contributions in the form of reports, magazine articles, and books, make a notable addition to the professional literature of industrial education.

He died on August 31, 1950, at Dunedin, Fla., where he had lived since his retirement.

DR. RAY FIFE DIES

Dr. Ray Fife of Columbus, Ohio, died on May 16, 1950. He was one of Ohio's well-known leaders in the field of vocational agricultural education, and his influence in vocational education affairs was felt throughout the nation. Dr. Fife was one of the most consistent and effective supporters of the A.V.A. He was A.V.A. president at the time the Washington office was established and during these difficult times gave unlimited support to the association and to the work that had to be done in Washington.

DR. BAWDEN GUEST PROFESSOR AT BRADLEY UNIVERSITY

Dr William T. Bawden, director of publications, Kansas State Teachers College, Pittsburg, was guest professor in the graduate school of Bradley University for a period of two weeks. The subject of his course was "Leaders in Industrial Education."

The class met for three hours daily, with an enrollment of 67 students, of whom 29 were candidates for the Ph.D. degree and 38 for the master's degree.

Mrs. Bawden, the former Maude M. Firth of Tulsa city schools, accompanied Dr. Bawden. On Wednesday evening, June 28, she addressed a dinner meeting of the Graduate Education club of approximately 80 members on the subject, "Recent Developments in Education for Home and Family Living."

FRANK MOORE HONORED

Frank Moore, supervisor of industrial arts, Cleveland, Ohio, and president of the American Vocational Association, was honored by the Cleveland Industrial Arts Club at a dinner meeting April 14, 1950. The unusually large attendance (some 500 or more) shows the esteem enjoyed by this leader in industrial-arts education.

H. R. MACKENZIE NEW EXECUTIVE VICE-PRESIDENT AND TREASURER OF S.V.E.

Hugh R. MacKenzie has been named executive vice-president and treasurer of the Society for Visual Education, Inc.

In addition to his broad background in the financial field, Mr. MacKenzie brings to S.V.E. a wide range of abilities in the business field, including accounting, market research, and operations. He is a graduate of the University of Chicago School of Business.

DR. ANTHONY GOLDBERGER RETIRED IN JUNE

A surprise dinner honoring Dr. Anthony Goldberger, professor of education and director of courses in vocational education at the University of Pittsburgh, was held Friday, May 5, at Webster Hall Hotel. It was sponsored by the Foundation for the Western Pennsylvania Industrial Teacher's Center, a new organization of industrial education teachers of Western Pennsylvania. The dinner was a testimonial to Dr. Goldberger for his long service to industrial education. His retirement took place at the close of the school term in June.

A bound volume of letters from his former students and associates also was presented to him.

A feature of the banquet was a program in which Dr. Gerald Whitney, former associate superintendent of Pittsburgh public schools; Dr. Paul Cressman, director of vocational education; Dr. Earl Dimmick, superintendent of schools; Irwin Rowntree, Pennsylvania State College; Andrew Trish, former co-ordinator and now state director of vocational education in Louisiana; and Dr. George Baird, took part.

More than 450 guests attended the banquet.

Dr. Goldberger was born in Philadelphia, November 12, 1887. He received the bachelor of art's degree from the University of Pittsburgh in 1912, the bachelor of science degree from the University of Pittsburgh in 1913, the master of art's degree from Columbia University in 1924 and the doctor of philosophy degree from Columbia University in 1930.

(Continued on page 32A)

FRANKLIN GLUE IS READY TO USE WHEN CLASSES START

Industrial Arts Teachers from coast to coast recommend

FRANKLIN Liquid HIDE GLUE

the ideal for class use

Here is a *genuine hide glue* that's ready to use without mixing, heating, muss or waste. Full strength, actually makes joints stronger than the wood itself. Tests prove from 4000 pounds to 5000 pounds per square inch with resulting 100% wood failure.

Franklin Liquid Hide Glue is used by best furniture factories and fine craftsmen. It's pleasant, no odor, and spreads thin to make almost invisible joints.

Costs less because there is no waste, unused portions can be poured back in can.

Ideal for school use: eliminates fire hazards, genuine hide glue recognized for years as craftsman's glue, no danger of chilled joints, spreads smooth, even, easy.

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6 SIZES: Tube, quarter-pint, half-pint, pint, quart and gallon.

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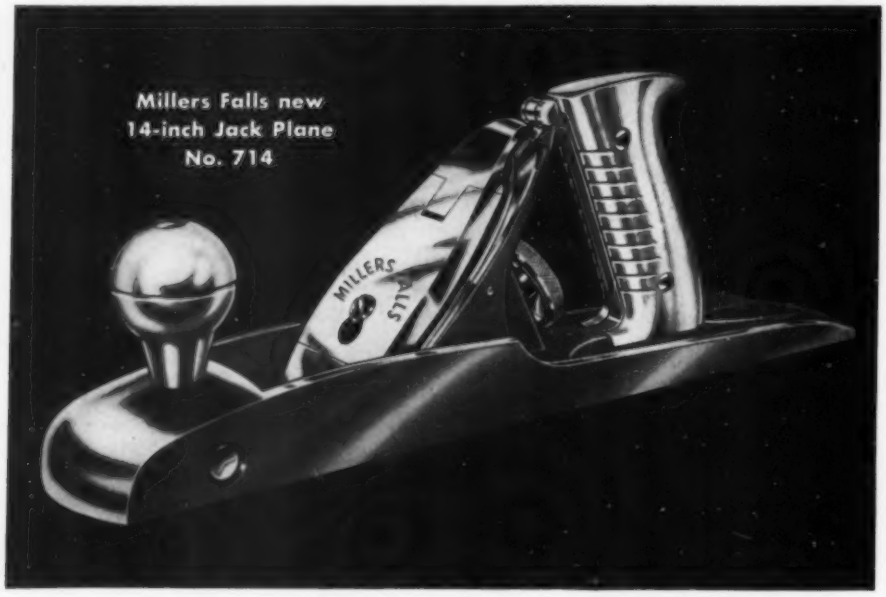

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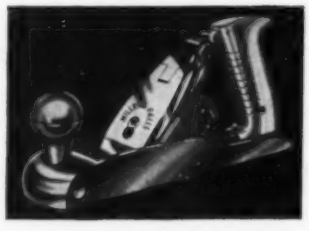

Millers Falls new 9-inch Smooth Plane No. 709

MILLERS FALLS TOOLS
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MILLERS FALLS COMPANY GREENFIELD, MASSACHUSETTS

PERSONAL NEWS

(Continued from page 30A)

Dr. Goldberger taught in the Philadelphia grade schools from 1907–12 and in the Pittsburgh industrial schools from 1912–14. He was a field worker in the Vocational Guidance Department, Pittsburgh schools, from 1914–16.

In the years 1916–17, 1919–29, he was principal of the Continuation School, Pittsburgh. Dr. Goldberger has been a professor of vocational education at the University of Pittsburgh since 1929. He served as acting dean of the School of Education, 1931–32. Before his retirement he was the director of Vocational Teacher Education at the University of Pittsburgh.

From 1917–19, Dr. Goldberger served as a psychological examiner in the U. S. Army. He also held the position of executive secretary of the Allegheny County Joint Committee on Scholarship Aid, secretary of the Western Pennsylvania Education Conference, and is a member of the Educational Policies Committee of the University of Pittsburgh Senate.

Dr. Goldberger is also a member of the National Education Association, Kappa Phi Kappa, Phi Delta Kappa, Kappa Delta Pi, and many other organizations.

PROF. SWOPE HONORED IN WHO'S WHO

The 1950 edition of *Who's Who in America* includes the name of Professor Ammon Swope of Purdue University, Lafayette, Ind.

♦ Robert W. English, assistant professor of industrial education of Southern Illinois University, received the doctor of education degree at the Pennsylvania State College on June 12.

Dr. English received his bachelor of science degree from James Millikin University, his master of arts degree from the University of Illinois. He has been a member of the faculty of Southern Illinois University since June, 1940.

From June, 1948, until September, 1949, he was on sabbatical leave from Southern Illinois University and studied at the Pennsylvania State College. During the summer of 1949 he did a research study on the planning of school buildings for industrial education working as an associate state supervisor for the New York State Education Department. In the process of making this study he visited thirty schools of greater New York State area and prepared a bulletin entitled "A Planning Guide for Vocational-Industrial and Vocational-Technical Education Facilities for Comprehensive High Schools," which is being published by the University of the State of New York.

As a result of this work, Dr. English is now serving on the North Atlantic States Regional Committee on School Buildings for Vocational Education. In this capacity, he is a representative of the New York State Department of Education.

Before coming to the faculty at Southern Illinois University, Dr. English taught at the Community High School, Granite City, Ill. He has been very active in the Illinois Industrial Education Association serving as a member of its executive committee from 1939–43, and is at present vice-president of this state organization, in charge of its program for industrial arts. He is a member of Phi Delta Kappa, Iota Lambda Sigma, and Kappa Phi Kappa professional fraternities and a member of the Carbondale Rotary Club. He is listed in *Who is Who in American Education,* and *Who is Who in Chicago and Illinois.*

♦ Howard R. Taylor, Jr., former public information officer for the U. S. Marine Corps Reserve, has been appointed assistant to the president at Fenn College, Cleveland, Ohio.

Mr. Taylor is a veteran of over four years' service with the U. S. Marine Corps in the Pacific theater. He was awarded the silver star, two bronze stars, and was discharged with the rank of captain.

♦ Ruth Naomi Thompson, a graduate of Ohio State and Western Reserve Universities, will be the director of the new Audio-Visual Communications Center to be set up this fall at Fenn College in Cleveland, Ohio.

Functions of the Center are: (1) to be of service to Cleveland industry in training personnel directors, engineers, management directors, and others in taking advantage of audio-visual aids in the training of their personnel; (2) to aid members of the Fenn College Faculty in their plans to use audio-visual aids as a supplement to books and lectures; (3) to train Fenn College students in education courses in the use of audio-visual aids in the elementary and high school classroom.

♦ Sune Engelbrektson, M.A., a graduate of the department of vocational education, School of Education, New York University, has just returned from a trip to Sweden where he spent last year attending woodworking courses at Naas. The school was founded by Otto Salomon, now called the August Abrahamson Foundation.

He has returned to the United States to continue his studies at New York University, in preparation for a Ph.D. degree while on a teaching fellowship in the department of vocational education.

♦ Dr. Claude H. Ewing, formerly director of the Chicago Vocational School, Chicago, Ill., has been appointed director of vocational education, Kamehameha Schools, Honolulu, T. H.

♦ Robert J. Kohl has been named sales promotion manager of the Society for Visual Education, Inc.

♦ Leslie C. Hardison, senior student at Illinois Institute of Technology, was awarded second prize in the midwestern student paper contest sponsored by the undergraduate section of the American Society of Mechanical Engineers.

He chose for his subject "Short Term Wear Testing of Diesel Engines."

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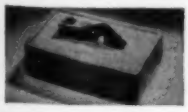
PEDRO snoozes beside a container that holds a full pack of cigarettes. Makes nice Xmas present. Kit, **60¢**



PANCHO is comfortably asleep atop a cigarette box. Easy to carve and work, some parts ready-shaped. Good painting and finishing practice. Kit, **60¢**

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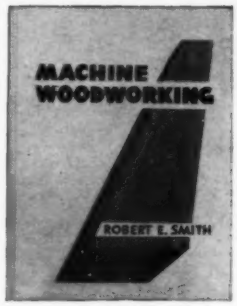

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REVISED 1948. Short teaching units give detailed instruction for operation and care of lathes, grinders, saws, jointers, planers, mortising machines, shapers, routers and sanders. 224 illustrations. Stresses safety procedures throughout and gives related information. Contents cover calipers, centering, turning, parting, concave and convex cuts, V grooves, mounting blades, cross cutting, angles, rabbets, bevels, grooves, tenons, mouldings, mortisers, shapers, fluting, beading, reeding, recessing, common measures and formulae as well as many other valuable topics. Only $3.00. Send for approval copy. Clip this.

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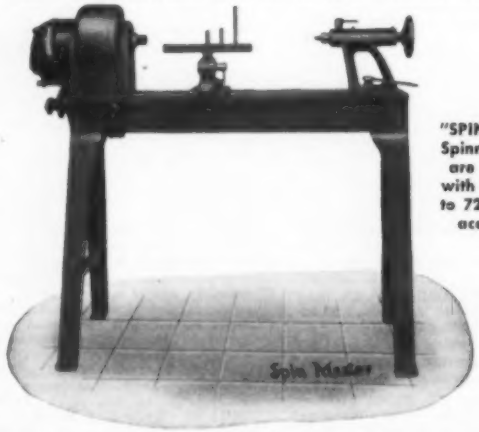
REG. U.S. PAT. OFF.
15 "METAL SPINNING LATHE"



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- Spin Master Metal Spinning Lathes are known in the trade to be the most substantial and the most productive causing least operator fatigue.
- They are also best for training purposes.
- The Model MS 15 shown above is not a converted wood turning lathe. It is engineered for fast production spinning. Available with floor or bench legs.

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- **WELLERTIP**—Rigid, more soldering area.

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News Notes

♦ A new safetygraph, showing why falls are one of the most serious of all industrial hazards, how they occur and how to prevent them, has been prepared by the National Safety Council.

Designed as a visual aid for small training groups, it consists of 12 — 18 by 24-in. spiral-bound pages, inserted in a leatherette portfolio. When set on a flat surface, it opens to form an easel. On the front pages, facing the audience, are colorful cartoons and duo-tone photographs. A safety talk for the instructor is printed in large easy-to-read type on the back.

One out of every four accidental deaths are caused by falls, the Council points out, and the illustrations show the hazards of ladders, scaffolds, makeshift equipment, slippery or cluttered floors, stairways, unprotected openings and horseplay.

Prices for this or other safetygraphs may be obtained by addressing the National Safety Council, 425 North Michigan Ave., Chicago 11, Ill.

♦ Supervisory and Foreman Training, a series of five sound films each with correlated record, the basic principles of which have been successfully used by numerous large and small employers, are available.

Their purpose is to (*a*) supplement and strengthen the employer's present supervisory training program and (*b*) to furnish basic material for inaugurating such a program. Each film (with record) is sufficient material for a single session or lesson. Subjects are: (1) Preparing for the Future (66 pictures); (2) Safety for Sale (73 pictures); (3) Fair and Cool (67 pictures); (4) Big Little Things (81 pictures); (5) New Men at Home (73 pictures). For details write to *The Jam Handy Organization, 2821 E. Grand Blvd., Detroit 11, Mich.*

♦ Experts on noise will meet October 20, 1950, at Armour Research Foundation of Illinois Institute of Technology to discuss excess decibels and how to get rid of them.

The National Noise Abatement Symposium will discuss the effects, measurement, and control of many types of noise. Joint sponsors of the national meeting are the National Noise Abatement Council and Armour Research Foundation.

The meeting will follow a two-day Shock and Vibration Symposium, scheduled for October 18 and 19 at the Foundation, where representatives of the armed forces, universities, industrial laboratories, and common carrier organizations will discuss various methods of measuring shock and vibration.

♦ Illinois Institute of Technology will begin a series of five-week courses in civilian defense against atomic effects.

A one-year contract has been signed with the Atomic Energy Commission to provide study in five subjects: (1) fundamental physics of radioactivity; (2) biological effects of radiation; (3) detection and measurement of radioactivity in all types of substances; (4) disaster phenomena; (5) civilian defense against radioactivity.

In addition, the course will include an intensive survey of the fundamentals of nuclear physics and properties of radioactive substances.

Each class will consist of a maximum of 25 persons selected by state governors and approved by the AEC. These persons will head state and local agencies in civilian defense.

♦ In the coming fall and spring terms, 1950–51, the Department of Vocational Education of the School of Education of New York University, will present the following new courses: The Industrial-Arts Teacher in the School Program; and Project Design I and II; Textile-Fabric Decoration I and II; and Graphic Arts Crafts I and II.

♦ The course entitled Community Resources for Industrial Arts was conducted during the summer of 1950, at the New York University School of Education. This course consisted of visiting various industrial plants in the metropolitan area. One session a week was devoted to classroom discussions of the visits made the previous week.

♦ Occupational brief No. 97 on tailors and dressmakers; No. 99 on funeral directors and embalmers; and No. 100, postal workers are now available. These briefs may be obtained regularly at $5 per year (50 issues).

♦ The Industrial Arts Club, Tennessee Polytechnic Institute, Cookeville, Tenn., has prepared a pamphlet which contains information about the college, the industrial-arts curriculum, and a picture of the personal qualifications of each industrial-arts major who was graduated in June and August, 1950.

The club rendered this service as an aid to prospective employers and the industrial-arts majors. The idea embodied in this pamphlet is very much worth while and might be found helpful by other teacher training institutions.

♦ The industrial-arts department of Southwestern Louisiana Institute presented an outstanding exhibit on the campus during the annual district literary rally. The exhibit consisted of a miniature model shop, a display of the latest power woodworking tools and of projects made by industrial-arts students from neighboring schools.

The model shop was a scaled replica of an ideal workshop. Miniature models of all the various machines were carved by industrial-arts students of Southwestern Louisiana Institute. These miniature models were arranged in the shop to provide maximum working space and greatest efficiency.

(Continued on next page)

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PUNCH. Insert paper . . . push down handle.

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NEWS NOTES

(Continued from previous page)

The object of the display was to acquaint teachers, principals, and students with the benefits of industrial arts in an effort to promote further development of the industrial-arts program in the schools of Louisiana.

As a result of the widespread interest shown at the exhibit, plans for next year's exhibit will include a display wherein more schools will be represented.

♦ The Celotex Corporation has published a new eight-page brochure on its newest type of suspended acoustical ceiling construction, the Acousti-Line system. This book contains drawings showing the various parts of the system and how they quickly clip together to form a perfectly level ceiling from which any 12 by 24-in. acoustical tile can be removed instantly for access into the back-ceiling space.

♦ "The Case for Color," a new 25-minute, 16mm. sound movie in color explaining "Color Conditioning" — the du Pont Company's painting plan — has been released. Showings to interested parties may be arranged without cost by writing to the Finishes Division, E. I. du Pont de Nemours and Co., Inc., Wilmington 98, Del.

♦ Since July 1, 1950, the New York Technical Institute, 301 N. Paca St., Baltimore 1, Md., has been known as the Maryland Technical Institute.

♦ Twenty states will receive awards for noteworthy progress in developing driver education courses in their secondary schools under the 1950 High School Driver Award Program of the Association of Casualty and Surety Companies.

Awards were based on detailed reports submitted by representatives appointed by the governor of every state. A board of leading educators and safety specialists, meeting at the Roosevelt Hotel in New York City, cited the following states for outstanding achievements in advancing safe driver education in their high schools: Arizona, California, Illinois, Indiana, Massachusetts, Michigan, New Jersey, North Dakota, Oklahoma, Wisconsin, Connecticut, Delaware, Minnesota, New Hampshire, Texas, Utah, Virginia, Washington, West Virginia, and Georgia.

Official reports of the 48 states which participated in the award program show that 6995 high schools throughout the nation offered safe driver training courses during the 1949–50 school year. This was an increase of 23 per cent over the 1948–49 figure of 5678 high schools. During the same period the number of students enrolled in the course rose from 440,552 to 551,280, an increase of 25 per cent.

♦ The Borden Company, 350 Madison Ave., New York 17, N. Y., has experimented with a new way of making sand molds for metal casting, which uses plastic resin as a binding agent. The new method cuts down the use of sand by 90 to 95 per cent and reduces casting machining costs by more than 50 per cent.

The process calls for a dry sand mixture containing 8 per cent of special phenolic resins. A shell about 3/16 in. thick is produced by dumping the mixture against a hot metal pattern for 4 to 6 seconds and then oven-curing the resin for about 4 minutes. The mold halves are made ready for pouring by being clamped together or placed in a box and reinforced with steel shot. Experiments indicate that castings up to 150 pounds weight can be made by this process.

The process makes possible precision casting at low cost since the resin-sand molds yield castings with great surface smoothness, outstanding definition and trueness to pattern.

Borden experiments show that finish machining of castings can be eliminated or greatly reduced, depending on the degree of precision required. The simplicity of the process not only requires a smaller labor force, but also makes possible the use of unskilled labor.

♦ Veterans Administration today ruled that a fourth year course of G.I. Bill institutional on-farm training, offered by certain states for eligible and qualified veterans, is entirely within the law setting up the on-farm training program.

These provisions must be met, however:

1. The veteran-trainee must have enough remaining entitlement to take the additional training.
2. He must qualify under state standards for the advanced course.
3. The additional farm training must be approved by the state.

V-A emphasized that under the law, regardless of the maximum length of a farm training course, the period of time a veteran can spend at it depends upon two chief factors: his entitlement to G.I. Bill training and his individual needs of the course.

♦ Natural rubber greatly improves the durability of leather in a new treating process developed by Rene Oehler, Timothy J. Kilduff, and Sverre Dahl in the leather laboratory of the National Bureau of Standards. Through this impregnation of leather with natural rubber, they have been able to increase the abrasion and water resistance so that substandard leather, such as "belly cuts" from steer hides, may be used commercially.

The bureau also is exploring the use of synthetic resins in the treatment of leather, and investigations are now under way on the use of synthetic rubber and other materials.

♦ A new 93-page circular, *Testing by the National Bureau of Standards*, has just been published which fully describes the Bureau's test policy, presents general information on testing, and lists fees for most of the test work that is done. This circular is now available from the U. S. Government Printing Office, at 25 cents a copy.

Write for National Bureau of Standards Circular C483, to Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

♦ According to Dr. Alfred R. Shands, Jr.,

(Continued on page 46A)

HIGGINS
PEN
CLEANER

Cleans your pens CLEAN

HIGGINS PEN CLEANER makes them better than new, for they are clean and also "broken in." Cleans your pens and instruments encrusted with dried waterproof drawing inks. It is non-inflammable, harmless to brushes and instruments, non-injurious to skin and clothing and non-volatile.

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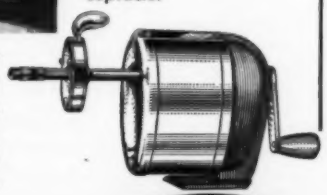

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MAYLINE MAYLINE MAYLINE

Looking for an Art Department BUDGET-STRETCHER?

Hamilton has the answer!

What's so sensational about the V-1704? Not a thing! It's just a mighty fine student drawing table available at a surprisingly modest price. Solidly built of Northern Wisconsin Birch throughout, and attractively finished in Golden Brown, the V-1704 offers easy, fool-proof top adjustment without clumsy protruding levers. Both tilting and stationary tops are generous work-size, and tilting top is equipped with an adjustable paper ledge. Stationary top furnishes generous reference surface for colors, etc.

There's a *built-in bonus* of quality in all Hamilton school equipment—the result of Hamilton's unmatched experience and manufacturing facilities. So whether you're buying a single table or completely equipping a new art room, find out more about the Hamilton V-1704 student drawing table. A similar table 36" long x 24" wide by 30" is listed as No. V-1703. Write for full details and prices today.

	LENGTH	WIDTH	HEIGHT	DEPTH
Overall	34"	20"	30"	
Drawer	14½"	9"		2⅛"
Adjustable Top	24"	20"		
Stationary Top	10"	20"		

Hamilton
Student Table
V-1704

Hamilton
MANUFACTURING COMPANY
Two Rivers, Wisconsin

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Shop Equipment News
NEW PRODUCTS — PUBLICATIONS

LAST WORD TEST INDICATOR AND SHOCK ABSORBING ANVIL

The new No. 711-E Last Word Indicator can be used for precise indicating either in machining, layout, checking or inspection operations.

The new Universal Swivel Friction Holder on the end of the body permits using the indicator in the chuck of jig borers, milling machines, or boring machines. By means of the ball swivel joint, the indicator is adjustable to sweep any hole or other surface within its range. A Universal Shank also supplied can be attached to the end of the friction holder allowing indicator to be used on 18- and 24-in. vernier height gauges, on lathes in the tool post holder, and on milling machines and other applications.

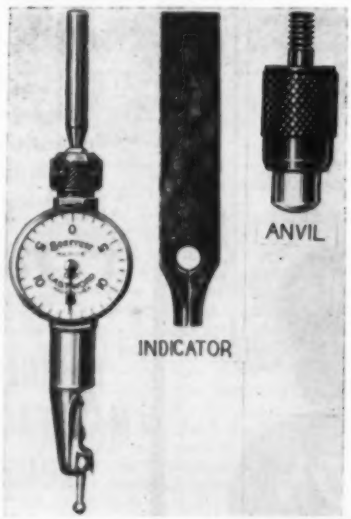
The No. 711-E has an adjustable dial $1\frac{15}{16}$ in. in diameter, range .030 inches, reading 0-15-0 and is graduated in thousandths.

Attachments, including extension arms and couplings, a body clamp, surface gauge attachment, three different sizes of contact points, as well as the height gauge and jig borer attachments also are available.

The new Starrett shock absorbing anvil provides a simple and inexpensive way to convert any standard dial indicator with solid type contact point into a shock-absorbing indicator which will be highly resistant to damage from sudden impact. The thread size on this new indicator point is No. 4-48 which is A.G.D. Standard and readily replaces the solid point of any make of dial indicator.

For further information write to *The L. S. Starrett Co., Athol, Mass.*

For brief reference use IAVE—1001.



New Starrett last word test indicator No. 711-E with universal friction holder and universal shank

SHIELDED WELDERS' CLAMPS

A new line of "Jorgensen" shielded welders' clamps has just been announced by the Adjustable Clamp Company. The new No. 120-S line features the distinctive Jorgensen steel shield over the full length of the clamp screw, to protect the screw from *spatter* and other damage. This feature has been proved most satisfactory and economical on two lines of "heavy duty" Jorgensen shielded welders' clamps, and is now adapted to a "general service" weight of clamp.

Shielded welder's clamp

Style No. 120-S "Jorgensen" shielded welders' clamps are available in all sizes from 2 to 12 in.

Free descriptive literature is available from *Adjustable Clamp Co., 424 No. Ashland Ave., Chicago 22, Ill.*

For brief reference use IAVE—1002.

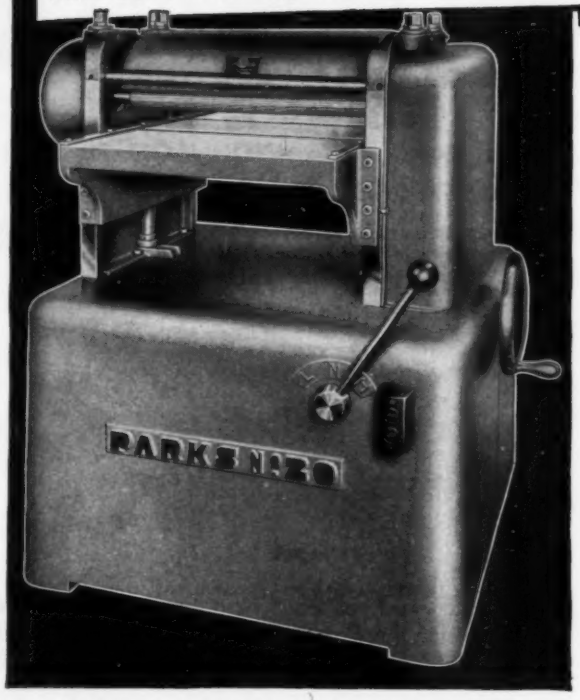
NEW ROTATABLE BLADE KEYHOLE SAW

The Millers Falls Company has recently introduced a new rotatable blade No. 525 Keyhole Saw. It is an inexpensive tool for both home

(Continued on page 41A)

Millers Falls new No. 525 keyhole saw

The Sensationally NEW Low-Priced



PARKS No. 20 20" PLANER

Here is a modernly designed, rugged, high-speed, low-priced planer that is ideally suited for every shop and industrial plant requiring a quality surfacer. The Parks No. 20 Planer has a four-knife cutterhead with a speed of 3600 R.P.M. and offers two feed speeds — 20 and 40 F.P.M., and 40 and 80 F.P.M. Write for complete descriptive literature.

The PARKS Heavy-Duty 12" x 4" Planer

A compact, sturdy, thickness planer that offers mill planer precision and ruggedness at a sensationally low price. Write for descriptive catalog sheet.

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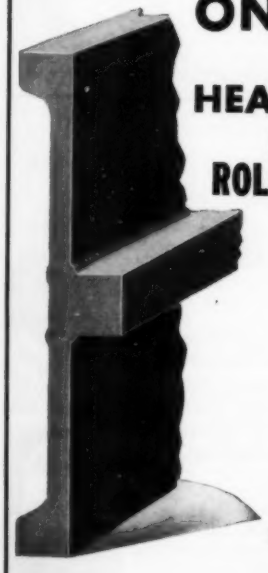

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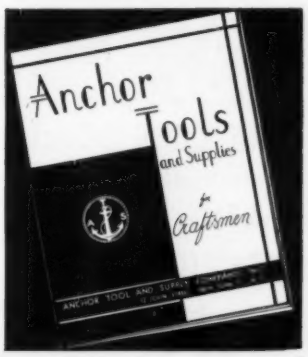

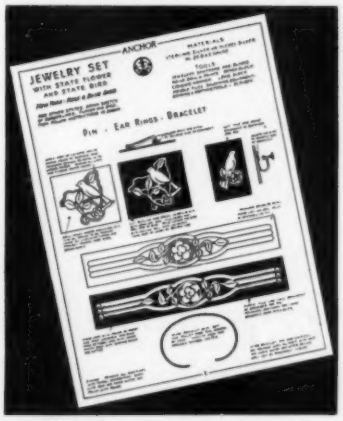

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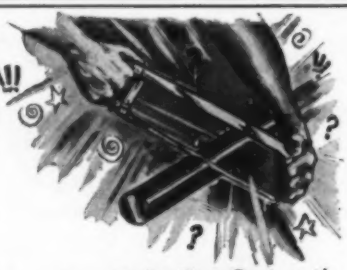

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PORTABLE POWER HACK SAW

Hand-I-Hack is the ideal hack saw for school shops. Requires little space. Can be used on and readily stored beneath any bench. It will work in any position. Extremely accurate and will cut any material up to 3" x 3". Simple, rugged, easy to understand and use. Low in first cost; cheap to operate. Uses standard hand blades. Can be afforded by any school shop. Write for literature.

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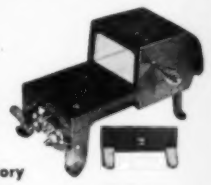
The Modern Way with Quick Acting JOHNSON Furnaces

No. 101 Bench Furnace

Delivers up to 1800° F. without a blower. Powerful, efficient and economical. For heating soldering coppers up to 12 lbs. per pair. Ideal for heat treating, case hardening, and annealing carbon steels. Two burners. Firebox 3¾ x 4½ x 5½. Complete with work rest block and baffle plate.

$17.50 F.O.B. Factory



No. 118 Combination Furnace

Use this furnace for heat treating carbon steels and for melting soft metals such as lead, tin, zinc, babbitt, etc. Lid on hood may be removed and 22 lb. melting pot inserted. Firebox 6¼ x 5 x 6½. Complete with pot as illustrated.

$33.00 F.O.B. Factory

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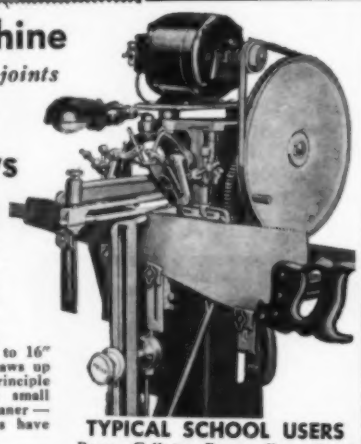
SAW FILING

This ONE Machine
automatically files and joints
HAND, BAND, CIRCULAR Saws



The Foley Saw Filer is ideal for sharpening saws used by students in school shops. It keeps them in tip-top shape, faster and better than by hand filing. Used by Army, Navy, hundreds of manual training departments and industrial plants. The Foley is the only machine that files and joints all hand, back and mitre box saws from 3 to 16 points per inch, crosscut circular saws up to 16" diameter (24" optional), and hand saws up to 24' long. Patented jointing principle automatically evens up large and small teeth, so saws cut faster, truer, cleaner — stay sharp longer. Foley filed saws have less breakage and last longer.

30-DAY TRIAL OFFER

You may have the privilege of using the Foley Saw Filer in your own shop for 30 days. Write or send coupon for details and list of school users.

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Berea College, Berea, Ky.; Board of Education, Cleveland, Ohio; Boys Technical H. S., Milwaukee Wis.; Charleroi School District, Charleroi, Pa.; Redlands Public Schools, Redlands, Calif.; Stout Institute Menomonie, Wis.

FOLEY Automatic SAW FILER

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Please send full information on 30-Day Trial Offer and list of school users of Foley Saw Filers.

Name.....

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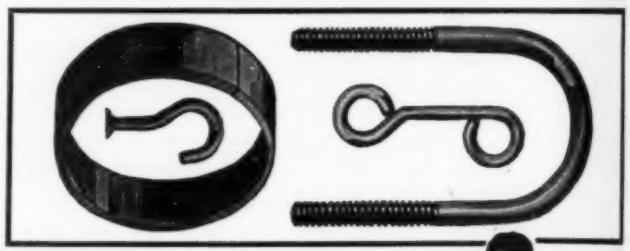

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Thousands of DI-ACRO Benders are in regular production use forming a great variety of small parts of manufactured products. Your students can learn to duplicate parts accurate to .001" in tubing, angle, channel, flat, round, or square materials with these precision machines.

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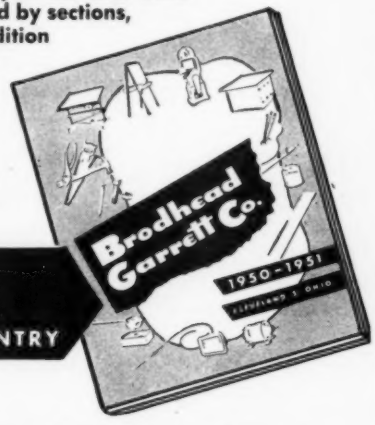

1 REQUISITION
RESPONSIBILITY
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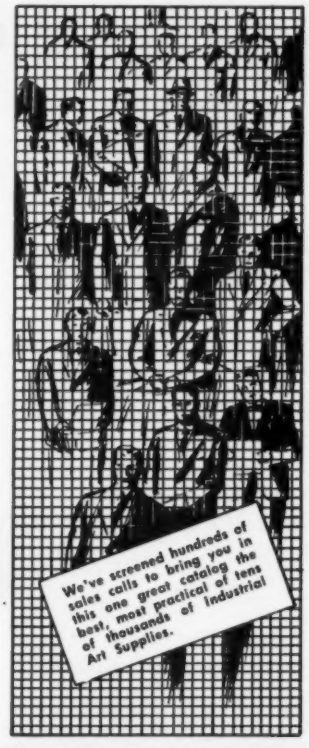
We've screened hundreds of sales calls to bring you in this one great catalog the best, most practical of tens of thousands of Industrial Art Supplies.

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Avoid extra handling, send entire material list to B-G.

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SHOP EQUIPMENT NEWS

(Continued from page 38A)

and professional use, which cuts steel, iron, wood, plaster, bone, plastics, nails, bolts, metal lath, asbestos shingles, nonferrous metals, fiber board, hard rubber, plywood, and many other materials fast and efficiently.

The tapered 11¼-in. blade reaches into tight places, curves, and corners where hack saw frames and standard wood saws cannot be used. Besides that it may be turned and locked in any one of eight positions.

Standard equipment includes a 10-tooth-to-the-inch "Tuf-Flex" blade of special patented hack saw alloy steel, heat-treated to produce a hard, tough, but flexible blade. Easily interchangeable, special purpose blades are also available. These include a 24-tooth "Tuf-Flex" and a 7-tooth spring tempered wood-cutting blade.

The finish is glossy gray and red enamel. The blade holder and knurled thumb screw nut are nickel plated. Over-all length is 15½ in.

For complete information write to *Millers Falls Co., Greenfield, Mass.*

For brief reference use IAVE—1003.

HUMIDICATOR

This "TAG" Humidicator is a precision pocket instrument, which shows relative humidity by the accurate wet-and-dry bulb method. It is shorter than a pencil and was developed by the Weston Electrical Instrument Corporation. This compact new instrument can be used either in the hand or mounted on a wall. A simple built-in slide rule converts the wet-bulb and dry-bulb readings directly into relative humidity, eliminating charts or tables.

It consists of two etched scale glass thermometers, secured in a white plastic case by integral resilient mountings. The psychometric slide rule

Pocket-size relative humidity indicator

forms the cover of this case. For use, a few drops of water are applied to the thermometer wick, and the instrument is fanned or swung for several moments. Setting the wet-bulb reading opposite the dry-bulb reading on the slide rule then indicates relative humidity.

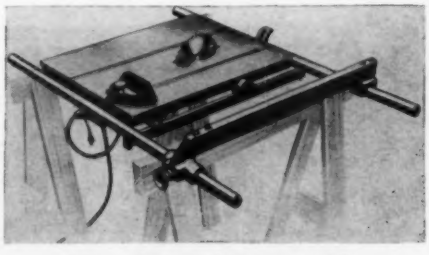
The "TAG" Pocket Humidicator finds application in heating, air conditioning, ventilating, refrigeration, industrial and chemical processing where the per cent of atmospheric humidity is a factor. Full details are available from the *Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.*

For brief reference use IAVE—1004.

NEW TILTING ARBOR SAW TABLE

The Porter-Cable Machine Co. of Syracuse, N. Y., announces a new tilting arbor saw table designed for use with its Speedmatic Portable saws.

The Model 5500 saw table doubles the utility of Porter-Cable's Speedmatic Saws, giving the



New tilting arbor saw table

builder a portable saw and a table saw at a great saving over the price of two independent units.

The saw table was designed primarily for use on sawhorses anywhere on the building site to save valuable time moving the work to the saw. To assure positive rigidity, sawhorses are notched 3/16 in. deep at the points where the rails rest.

Thirty-two inch steel legs also are available as accessory equipment for the table. A heavy-duty transparent plastic saw blade guard also is available. Absolute accuracy in finish cuts is assured by the heavy-duty rip fence and the fully calibrated miter gauge. The 26 by 20-in. table with 45-in. front and rear rails provides a maximum ripping capacity of 24½ in., permitting easy handling of unwieldy pieces such as the 4 by 8-ft. panels so popular in modern construction.

Specifications: table size — 26 in. deep, 20 in. wide; over-all width including rip fence rails — 45 in.; maximum depth of cut 90 deg., 2 9/16 in. with 8-in. blade, 2 5/16 in. with 7½-in. blade; maximum depth of cut 45 deg., 1¾ in. with 8-in. blade, 1½ in. with 7½-in. blade; maximum table surface in front of blade, 13¼ in.; maximum rip to right of blade, 24½ in.; maximum rip to left of blade, 14 in.; net weight, 44 lb., less saw and legs.

One of the features of the saw table is its portability . . . weighing only 44 lb., it can easily be carried in one hand. The top of the table is designed to flip over to allow 60-second attachment of the portable saw. When dropped back into place, the table automatically locks in position.

For brief reference use IAVE—1005.

HYDRAULIC TRANSMISSION SERVICE KIT

The Blackhawk Mfg. Company has announced a new wrench kit for transmission lubrication service.

It is designed for mechanics, service stations, garages, and car dealer shops to serve new

(Continued on page 42A)

"The Trade Mark of Quality"

PAXTON LUMBER

adds beauty and durability to all woodworking projects

We are prepared to supply you at all times with many kinds of highest quality materials, measured and graded in the best interpretation of current national grading rules.

WE ALSO OFFER A SOURCE OF SUPPLY FOR:

Ball Bat Blanks . . . Formica . . . Bed Panels . . . Furniture Squares . . . Bed Slats . . . Glues . . . Boat Panels . . . Rez . . . Bow Staves . . . Sample Sets . . . Closet and Chest Lining . . . Table Legs . . . Walnut-Cedar Chest Sets . . . Dowels

Write for Industrial Arts Catalog Containing Description of Various Kinds of Wood and Price List.

Modern school shops are assured of first quality materials when using Paxton lumber and plywood. That is because Paxton products meet every requirement of careful selection, grading, and uniformity. As a result, the student enjoys greater satisfaction from his efforts to create attractive articles out of wood and the shop benefits by the long-range economy that reliable materials insure.

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Fort Worth, Texas — P. O. Box 1225
Kansas City, Kansas — Packers Station

SHOP EQUIPMENT NEWS

(Continued from previous page)

and older types of hydraulic transmissions.

The kit includes a Blackhawk Ball-Head type ¾-in. ratchet wrench for work in cramped quarters, wrench extension, Allen 5/16-in. type wrench, ⅜-in. double hexagon socket, 9/16-in. single hexagon socket, ½-in. single hexagon socket, 7/16-in. single hexagon socket, 9/32-in. 4-pt. single square socket (all sockets in the ¾-in. drive), plus an Angle-Head box type wrench, chromium plated with 15/16-in. and 1-in. openings.

A brilliant-red metal panel is furnished for mounting on the wall to keep the tools neatly arranged as furnished with the set.

The Blackhawk kit will service the hydramatic transmission oil pan plug; flywheel cover bolts; hydramatic fluid coupling drain plugs; dynaflow torque converter drain plugs; old type hydramatic fluid couplings, drain plugs, and hydramatic oil pan plugs.

The set is available either with the metal panel in assortment No. 19622 or in a cardboard container as assortment No. 19623.

Additional information is available from Blackhawk's distributors or the *Blackhawk Mfg. Co., Milwaukee 1, Wis.*

For brief reference use IAVE—1006.

NORTON SCHOOL OF GRINDING

Norton Company has a new and fully equipped grinding school known as the "Norton School of Grinding."

It is staffed by its own men who have been selected for technical teaching and practical knowledge of grinding techniques.

New Norton School of Grinding

It is designed to teach the practical application of grinding and allied abrasive processes to the company's own sales trainees and plant supervisory personnel, to its distributor salesmen (both domestic and foreign), to customer personnel, and to instructors in grinding from engineering, trade, and vocational schools.

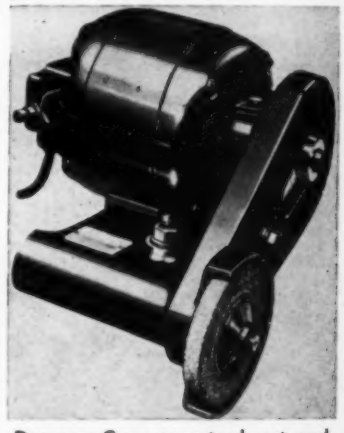
Behr-Manning Corporation, Norton's coated abrasives (sandpaper) manufacturing division at Troy, N. Y., conducts a parallel activity in its own plant and has demonstration and service engineering shops in several large cities.

For complete information on these schools, write to *Norton Co., 1 New Bond St., Worcester 6, Mass.*

For brief reference use IAVE—1007.

NEW TOOLPOST AND BENCH GRINDER

The utility grinder, a dual-purpose toolpost and bench grinder is announced by The Dumore Co., Racine, Wis. Accurate to .0002 in., the ¼-h.p., 5000-r.p.m. utility grinder fits lathes of



Dumore Company toolpost and bench grinder

9- to 13-in. swing for external cylindrical grinding. It can also be mounted on a shaper, planer, or milling machine for surface grinding.

When not needed for precision work it may be used for burring castings, cleaning welds, wire brushing, polishing, tool sharpening.

The grinder is powered by a ¼-h.p. constant-speed, continuous-duty motor. It is equipped with precision preselected bearings, preloaded and grease-sealed for life, and has a belt-tension adjustment, and a combination belt and wheel guard.

For brief reference use IAVE—1008.

HANDMADE PAPER FOR THE ART CLASS

The Fabriano line of handmade papers is again available in this country. It is available in standard sizes and weights, and in three surfaces: hot-pressed — smooth surface for pen, pencil, and mechanical drawing; cold-pressed — finely grained for pencil, crayon, and water color; rough — coarsely grained for water color.

Teachers may obtain a sample book by writing

(Continued on page 44A)

Look! **PROJECTS GALORE**

Leather Tooling and Carving — 45 Projects
Groneman $2.75 Cloth, $2.00 Paper

How to Make Modern Jewelry — 18 Projects
Martin and D'Amico $2.50

Crafts for Everyone — 95 Projects
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Joy of Handweaving — 70 Projects
Gallinger $4.25

How to Make Pottery and Ceramic Sculpture — 20 Projects
Duncan and D'Amico $2.50

Woodworking for Everybody — 46 Projects
Shea and Wenger $2.50

Household Mechanics — 148 Projects
Bedell and Gardner $2.50

The Student's Planning Book — For Planning — 15 Projects
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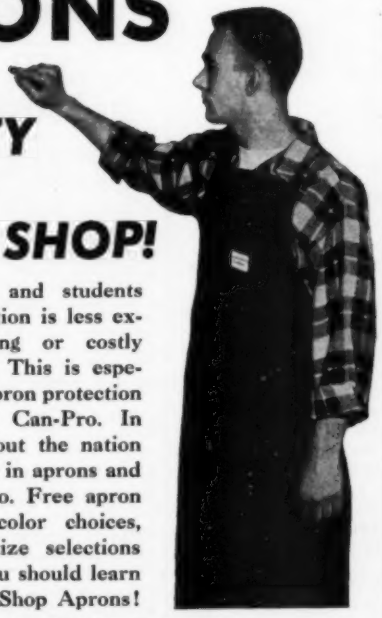
...are a NECESSITY in the SCHOOL SHOP!



Parents, instructors, and students agree, "Apron protection is less expensive than cleaning or costly clothes replacement." This is especially true when the apron protection is Shop Aprons by Can-Pro. In school shops throughout the nation the instructors' choice in aprons and shop coats is Can-Pro. Free apron with every dozen, color choices, Organization Plan, size selections . . . all are reasons you should learn more about Can-Pro Shop Aprons!

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CAN-PRO
"The School Apron Folks"
24- East McWilliams St. Fond du Lac, Wis.

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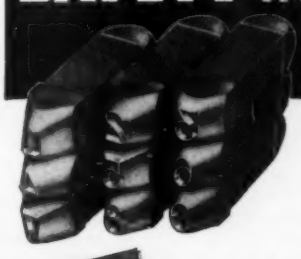
USE "SAFETY" WEDGE GRIP LETTERS and FIGURES



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FLEXIBILITY OF CONTROL to provide for proper firing and cooling cycles.

STURDY CONSTRUCTION providing for maximum troublefree operation.

Shown above is a Harper Electric Studio Kiln SK-151416 in operation at the State Teacher's College, Buffalo, N. Y. This kiln has 1½ Cu. Ft. of useful firing space and will accommodate the ware of 35-40 students. Mr. E. H. Strong, Instructor of Industrial Ceramics, at extreme right, states: "I have found the Harper Studio Kiln an ideal piece of equipment for Ceramic training in the Industrial Arts Field. I particularly like the capacity of this kiln to operate safely and efficiently in any temperature range that may be required of it."

There is a Harper Kiln to meet every firing requirement. Our Kiln Department will be glad to send you full particulars on them.

HARPER ELECTRIC FURNACE CORPORATION
1445 Buffalo Avenue
NIAGARA FALLS, NEW YORK

SHOP EQUIPMENT NEWS

(Continued from page 42A)

to *F. Weber Co., 1220 Buttonwood St., Philadelphia 23, Pa.*

For brief reference use IAVE—1009.

NEW SKILSAW DRILL KIT

A low cost drill kit, containing all equipment needed for drilling, polishing, sanding, and grinding, has just been introduced by Skilsaw, Inc.

It features a sturdy ¼-in. drill with hand tightening chuck and safety trigger switch. This powerful drill plus a kit full of easily attached accessories allows homecrafters and hobbyists to do dozens of varied jobs faster and easier than by hand.

Skil Model 587 home shop drill kit

The complete drill kit includes 3 twist drills for drilling in wood, metal, plastic, and plaster; lamb's-wool bonnet for polishing cars, furniture, linoleum, and cabinets; sanding disk for removing paint and rust, sanding wood and metal; and 3-in. grinding wheel for sharpening tools or removing imperfections from metal.

The kit comes packed in an enameled finish steel carrying case.

For full information on the Skil Model 587 Drill Kit, write to *Skilsaw, Inc., 5033 Elston Ave., Chicago 10, Ill.*

For brief reference use IAVE—1010.

PEWTER AND BRASS DISKS

Pewter and brass flat and preformed disks as well as rectangular pieces have recently been added to the complete line of craft metals handled by Metal Goods Corp., a leading craft metal supply house.

In addition to these new additions aluminum and copper circles as well as aluminum, copper, and stainless steel rectangles are stocked.

As an additional customer service Metal Goods now services handicraft mail orders from six Metal Goods warehouses located throughout the middle and southwest, instead of filling all mail orders from the general offices in St. Louis. This, of course, speeds shipments and makes return-mail service possible.

For full information write to *Metal Goods Corporation, St. Louis 15, Mo.*

For brief reference use IAVE—1011.

DRAFTING SUPPLIES PRICE LIST

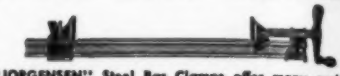
A 16-page price list on drafting supplies has just been issued by the Brodhead-Garrett Co., 4560 E. 71st St., Cleveland 5, Ohio.

It gives information and prices on mechanical drawing instruments and sets, T squares, triangles, irregular curves, drafting machines, drawing boards, scales and protractors, drawing pencils and inks, erasers, drawing and tracing papers, and drawing tables.

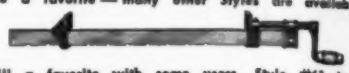
For brief reference use IAVE—1012.

Specify and Insist Upon GENUINE "Jorgensen" TRADE MARK REG U S PAT OFF

STEEL BAR CLAMPS



"JORGENSEN" Steel Bar Clamps offer many exclusive desirable features. The "multiple disc clutch" holds securely, releases easily without notches or other deformity in the bar. Fast operating and economical — repairs easily made if ever necessary. Built to industrial standards, they will serve you best in the school shop. Style #70 "JORGENSEN" I-bar Clamps are a favorite — many other Styles are available.



Still a favorite with some users, Style #61 is a "notched bar" type steel bar clamp. Somewhat slower in operation than our "fast-operating" bar clamps, but just as carefully designed. Will provide long, satisfactory service.

"JORGENSEN" Handscrews are regarded as the "standard" everywhere for school-shop and industrial service. Jaws are carefully selected, properly seasoned hard maple, made in our own factory; cold-drawn steel spindles; hard maple handles will not come loose. Look for the trade-mark "JORGENSEN" on every jaw.

"Jorgensen" TRADE MARK REG U S PAT OFF AND "Pony"

Steel Bar Clamps, "C" Clamps, Handscrews, Clamp Fixtures, Press Screws, Lathe Dogs, etc., are available thru your favorite tool supplier — cost no more than ordinary clamps!

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Every project thoroughly tested . . . up-to-the-minute designs to create maximum interest. Detailed instructions and complete working drawings given with each project . . . also photos of projects in process and completed.

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THINGS TO MAKE and HOW TO MAKE THEM
By Klenke — Vol. I $4.25
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CREATIVE CRAFTS IN WOOD By Dank $3.00

INDUSTRIAL ARTS ELECTRICITY By Lush $2.20

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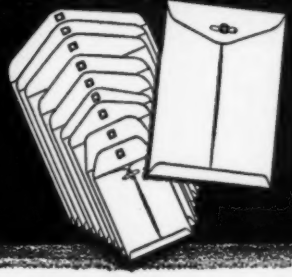

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"A convenient means to inexpensive packaging."

When you want extra safety and additional protection for your large or bulky materials to be mailed, then you should use a Clasp Envelope. These envelopes are built of rugged, heavy stock, equipped with a burrless metal clasp, and come in a wide variety of sizes. They are used in many cases to carry heavy magazines, machine parts, steel wool, shavings, instruction manuals, photographs, cloth or fabric samples, and similar large items that require complete protection but do not call for the expense of a box container. The clasp feature permits you to insert and extract the contents several times. The clasp also allows you to send material through the mail at third class rates yet guarantees you of a protective seal.

Western stocks 22 sizes ranging from 2½"x 4¼" to 12"x 15½".

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"Your book proved to be a bonanza as far as wealth of material is concerned . . ." (Interest is the inevitable result of materials that help the student solve his everyday problems.. This book provides a wide variety of such material.)

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★ *Extracts from the dozens of letters received from educators praising this new book.*

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NEWS NOTES

(Continued from page 36A)

medical director of the Alfred I. du Pont Institute of the Nemours Foundation, Wilmington, Del., approximately 5 to 7 out of every 100 children who return to school this fall will have a physical limitation. If proper care is not given to these children, the greater number of them will grow into adult life handicapped both in mind and body.

Classroom teachers who know which children have physical limitations should find out from the parents what has already been done for them and ask the school nurse and doctor what they can do to aid in the child's rehabilitation. As early as possible, the crippled child ought to learn to do everything he can for himself, and should not be assisted unless absolutely necessary or ask needless favors of others.

The teacher can be truly effective only if she understands the physical needs of the child and can help him toward the best use of his abilities.

♦ Entitled "Sky-Glo," this new 6-page bulletin is profusely illustrated with typical installations of "Sky-glo" Luminous Louverall Ceilings. Shows how "Sky-Glo" aids successful modernization programs without high alteration costs. Interesting data and comparative tables point out efficiencies of different louverall lighting systems. Issued by Benjamin Electric Mfg. Co., Des Plaines, Ill.

♦ Modern, streamlined lighting of factories is the subject of the new "Magna-Flo" Bulletin, issued by Benjamin Electric Mfg. Co., Des Plaines, Ill. The bulletin contains complete specifications and lighting data on the entire range of new "Magna-Flo" Fluorescent Lighting units for 96-, 72-, and 48-in. T-12 slimline lamps. Exclusive maintenance-cost cutting "Springlox" lampholders, which are standard "Magna-Flo" equipment, are also described.

New Publications

Primary Batteries

By George Wood Vinal. Cloth, 336 pp., 5¾ by 8⅝ in., illus., $5. John Wiley & Sons, Inc., New York, N. Y.

A text on the history, theory, chemical reactions of the materials used, methods of manufacture, and operating characteristics of these batteries.

Several types of special purpose batteries also are explained.

Treated in the 12 chapters are the history, elementary theory of electric cells, dry cells, the operating characteristics of dry cells, effects of low temperatures on dry cells, low temperature types, standard cells, air-depolarized and other batteries, copper and copper oxide cells, silver oxide and chloride batteries, lead cells, mercuric oxide and vanadium dry cells, and fused electrolyte cells.

Boats You Can Build

Compiled by the Editors of *Popular Mechanics Magazine*. Cloth, 191 pp., 6¾ by 9½ in., illus., $2. Popular Mechanics Press, Chicago, Ill.

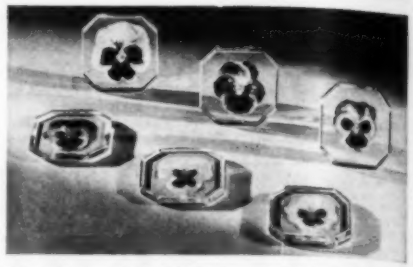
A book to make young and old lovers of boats glad. The directions are clear and simple, and the illustrations are uniformly good.

The boats described are rowboats, dinghies, cabin cruisers, sportsman's boats, sailing boats, sloops, "Just for fun" craft, and training ships for young sailors.

The 23 types of boats described give plenty of choice to the most critical.

The book also contains a chapter on seamanship and on servicing a boat.

(Continued on page 48A)



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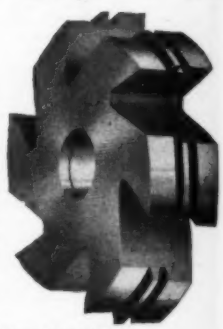

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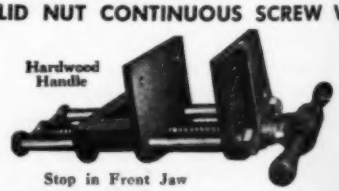

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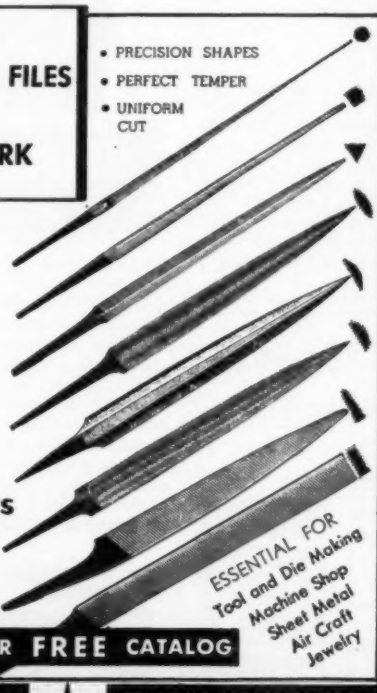

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NEW PUBLICATIONS

(Continued from page 46A)

Circuits in Electrical Engineering

By Charles R. Vail. Cloth, 560 pp., 6 by 8⅝ in., illus., $5.75. Prentice-Hall, Inc., New York, N. Y.

A theoretical course on circuits which requires a knowledge of fundamental physical theory, and mathematics through basic calculus.

Part I presents a general background; the concepts of what an electric current, electromotive force, resistance, conductivity, etc., actually is.

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Part IV takes up the analysis of nonsinusoidal waves, and nonsinusoidal waves in electric circuits.

Part V takes up the subject of transients.

Tested Training Techniques

By Kenneth B. Haas and Claude H. Ewing. Cloth, 111 pp., 5¾ by 8⅝ in., illus., $1.50. Prentice-Hall, Inc., New York, N. Y.

The authors of this book do not preach — they ask the reader to do as they do. They emphasize especially that students must be treated as individuals, that the teacher himself must be well acquainted with what he wants to teach, and that the facts to be taught must be made clear and simple so that the student can readily grasp them.

They also insist on testing the student to see that what has been taught has also been learned, and they advise the teacher to make adequate use of learning aids.

The book is illustrated throughout with numerous catchy and telling cartoons.

Ceramics for All

By Jimmie Adair Stewart. Cloth, 156 pp., 5⅛ by 8¼ in., illus., cloth edition $2, paper edition $1. Barnes & Noble, Inc., New York, N. Y.

A book for the beginner. The information is presented in a clear popular manner, and there are numerous illustrations.

Ceramics is an art that should have many followers and this little book may induce more people to take up this interesting activity that has come down to us from the earliest times.

The chapters of the book show clearly how to make the model, and from that, a mold. Casting is comparatively simple after the mold has been made. Then comes the finishing, decorating, and firing. The use of glazes is next explained, as is also glost firing, and the making and operating of kilns.

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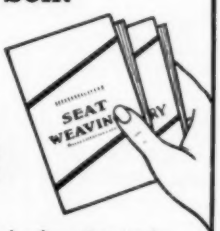

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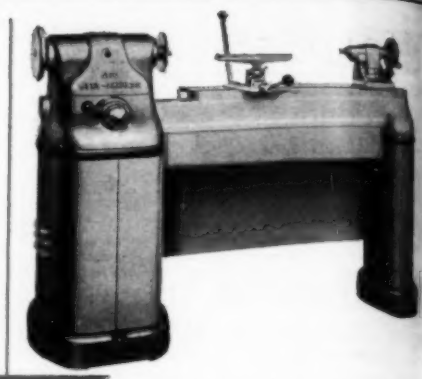

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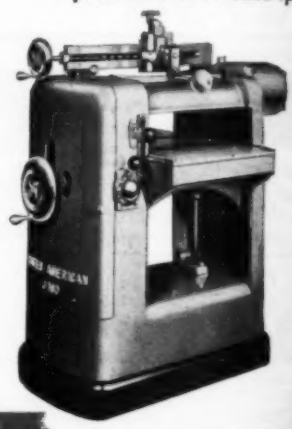

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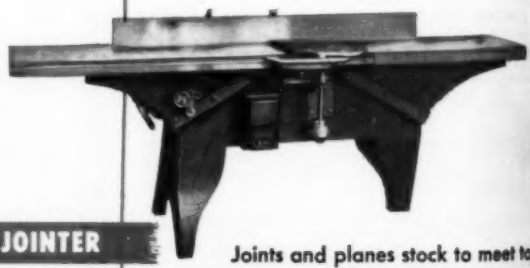

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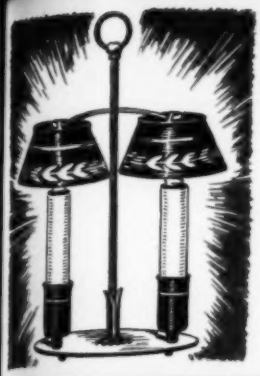

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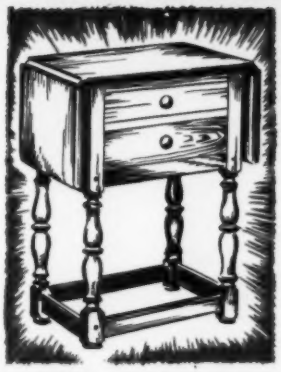

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Fifty projects for grades 7 to 12. $2.50

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Rules that have always governed good design explained and illustrated. $4.50

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YOU CAN WHITTLE AND CARVE, Gottshall & Hellum
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Thirty-four projects especially selected for their appeal and utility. $3.00

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Drawings, step-by-step directions. $2.75

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Fully dimensioned furniture projects of popular modern design. $2.00

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Complete units based on primary jobs and procedures. $1.75

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GEARED HEADSTOCK—Power is transmitted efficiently from motor to spindle at 8 conveniently-selected speeds. Gears, steel—spindle bearings, anti-friction.

QUICK-CHANGE FEED BOX—Up to 63 feeds and threads chosen simply, quickly through this fool-proof mechanism.

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Why can LeBlond build these heavy-duty features into Regal Lathes . . . giving you the most rugged, dependable performance in the light-lathe class?

Because only LeBlond can tap the vast engineering and production facilities of a plant building 76 lathe models. Add to this LeBlond's 63 years of leadership in machine tool design and production . . . and you have the LeBlond *combination* for top value in lathes.

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17"
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